THE ARCHITECTURAL RECORD

OCTOBER
1931

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THE ARCHITECTURAL RECORD

VOL. 70 NO. 4 OCTOBER, 1931

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Photograph by Nyholm and Lincoln

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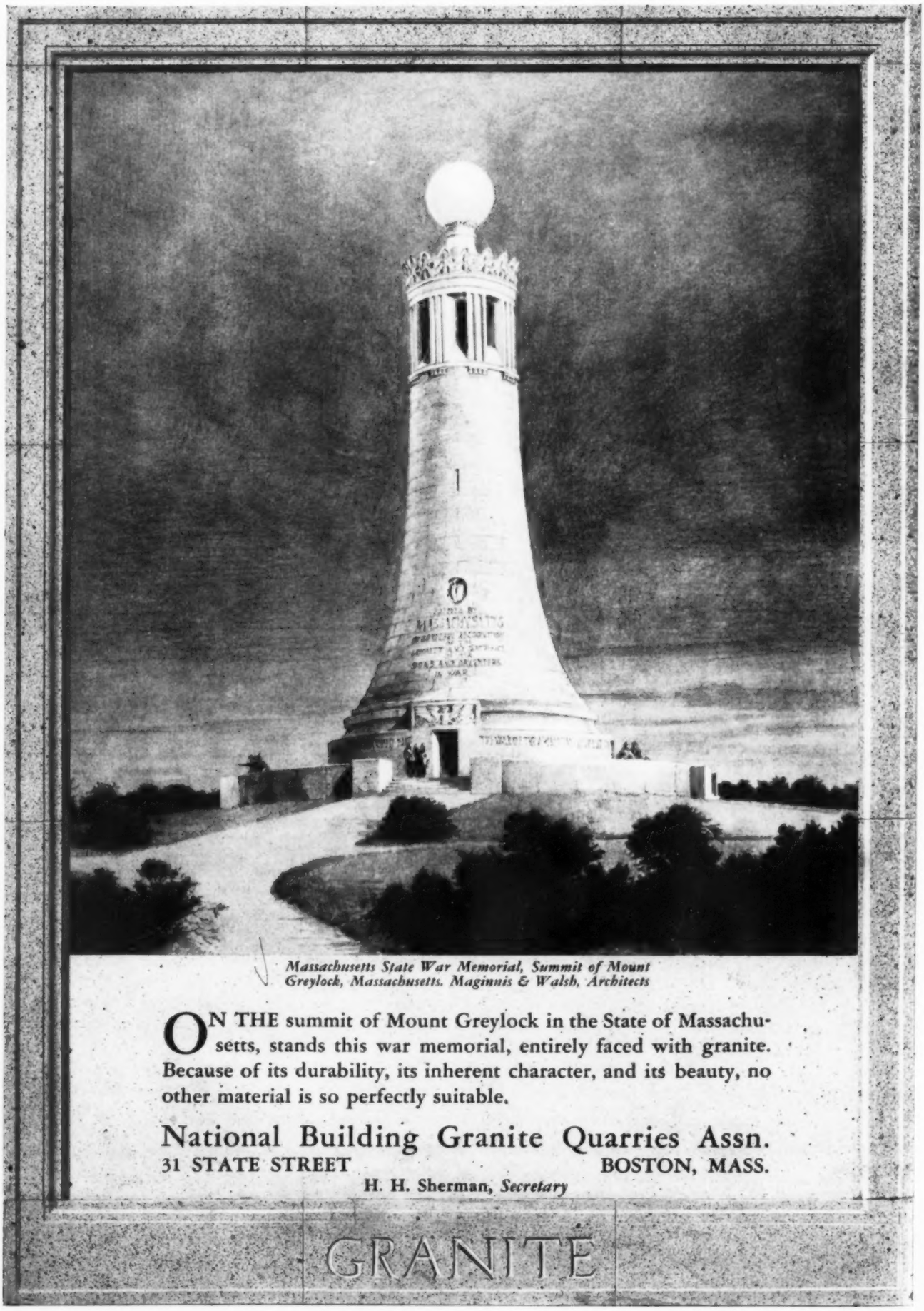

Massachusetts State War Memorial, Summit of Mount Greylock, Massachusetts. Maginnis & Walsh, Architects

ON THE summit of Mount Greylock in the State of Massachusetts, stands this war memorial, entirely faced with granite. Because of its durability, its inherent character, and its beauty, no other material is so perfectly suitable.

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H. H. Sherman, *Secretary*

GRANITE

CALENDAR OF EVENTS

October 1	"The Empire State Building" by William F. Lamb, Andrew J. Eken and Robert C. Brown. The New School for Social Research, New York.
October 8	Paris night at the New York Architectural League.
October 8	"Analysis of Various Well Known Buildings," by Albert Mayer, president of J. H. Taylor Construction Co. The New School for Social Research, New York.
October 9	Joint meeting of the American City Planning Institute with the Regional Planning Committee at Ann Arbor, Michigan.
Oct. 13-16	Silver Anniversary Convention of the Illuminating Engineering Society at Pittsburgh.
October 15	Closing date for entries to Fifth Annual Small House Competition. Address the House Beautiful, 8 Arlington Street, Boston.
October 15	"Foundations," by Carlton Proctor of Morgan and Proctor. The New School for Social Research, New York.
October 15	"Under the Sidewalks of New York," by Lawrence Herzog, at the New York Architectural League.
October 20	Closing date for international competition for architectural designs for the Palace of the Soviets to be built in Moscow. For information address Amtorg Trading Corporation, 261 Fifth Avenue, New York.
October 22	An exhibition and talk on Peasant Art by Chester Price at the New York Architectural League.
October 22	"Acoustics and Sound-Deadening," by G. T. Stanton, research engineer of the Western Electric Company. The New School for Social Research, New York.
Oct. 27-30	Ninth Annual Convention of the American Institute of Steel Construction at White Sulphur Springs, West Virginia.
October 29	"An Evening at the Colonial Exposition, Paris," under the direction of Henri Courtais, at the New York Architectural League.
October 29	"Illumination," by Foster Gunnison of Cox, Nostrand and Gunnison. The New School for Social Research, New York.
November	Exposition of Indian Tribal Arts, Grand Central Art Galleries.
November 5	"Elevators," by Bassett Jones of Meyer, Strong and Jones. "Air Conditioning or Manufactured Weather," by Mr. Lindsey or Mr. Keplinger of the Carrier Engineering Company. The New School for Social Research, New York.
November 12	"The Windowless Factory" (The Simmons Saw Company's Plant) and "The All-Glass Factory" (Proposed Building for the Toledo Scale Company), by W. J. Austin or J. K. Gannett of the Austin Company. The New School for Social Research, New York.
November 19	"The New York City Regional Plan," by Wayne D. Heydecker, secretary of the Regional Plan Association of New York. The New School for Social Research.
Until Dec.	Art Exhibition, Royal Society of Painters in Water Colours, London (5a, Pall Mall East).
December 1	Closing date for entries in 1931 Better Homes in America Competition. Address Better Homes in America, 1653 Pennsylvania Avenue, Washington, D. C.
December 1	Closing date of competition for monument to the First Permanent Settlement of the West at Harrodsburg, Kentucky. Address the Quartermaster General, Munitions Building, Washington, D. C.
Dec. 1-15	The 34th Architectural Exhibition, conducted jointly by the Philadelphia Chapter of the American Institute of Architects and the T-Square Club. The Exhibition will be held in the Architects Building, Philadelphia.
	"Radio City," by Raymond Hood, one of its architects. The New School for Social Research, New York.
December 10	"Port Authority Planning," a lecture at the New School for Social Research, New York.
December 17	"Village and Town Planning," a lecture at the New School for Social Research, New York.

ANNOUNCEMENTS

Thomas Pym Cope, architect, announces that he has opened offices at 200 East Johnson Street, Germantown, Philadelphia.

Aug. M. Kleeman, architect, announces the removal of his office to 960 Springfield Avenue, Irvington, N. J.

Karl W. Muck announces that he has severed his connection with the County of Los Angeles as County Architect and has set up his own architectural practice, specializing in public institutional buildings. His office is in the Architects Building, Fifth and Figueroa Streets, Los Angeles.

Charles Woods Webster, architect and structural engineer, has moved from the Cutting Building to the Terminal Building, 301 No. Ottawa Street, Joliet, Illinois. He also has a branch office at Waukegan, Illinois.

O'Meara and Hills, architects, and Clair W. Ditchy, associate architect, announce their association for the practice of ecclesiastical architecture with offices in the Fisher Building, Detroit, Michigan, and at 5709 Waterman Boulevard, Saint Louis, Missouri.

COLLEGE OF TEXAS

The course in architectural design in The Agricultural and Mechanical College of Texas has been extended to five years, according to an announcement by Ernest Langford, head of the Department of Architecture.

UNIVERSITY OF SOUTHERN CALIFORNIA

George N. Sprague of Philadelphia has just been appointed lecturer in architecture at the University of Southern California. Mr. Sprague is a graduate of the University of Pennsylvania, and has practiced architecture in Philadelphia and in Wilmington, Delaware.

With the opening of the fall term, the former school of architecture at the University of Southern California becomes a college with a continuous 5-year program and entrance direct from high school.

MONUMENT TO THE SETTLEMENT OF THE WEST

Architects and sculptors who are citizens of the United States are invited to submit designs for a proposed monument to the First Permanent Settlement of the West at Harodsburg, Kentucky. Those intending to compete should make application for the necessary program and accompanying data to the Quartermaster General, Munitions Buildings, Washington, D. C., who will act as the representative of the Secretary of War in connection with this work. Closing date of the competition is December 1.

LECTURES OF THE NEW SCHOOL

A course in present day problems of architecture and construction under the chairmanship of Albert Mayer is announced by the New School for Social Research, New York City. Classes will be held Thursday evenings at 8:20, beginning October 1.

The purpose of this series of lectures is to give the architect, owner and builder a resume of the latest developments; and to give the public an idea of what it should look for, or can reasonably expect, as dwellers in houses, apartment houses or in office buildings.

The lectures, which will be illustrated by lantern slides, are listed in the Calendar.

Ralph Steiner

Lucian Bernhard came to this country eight years ago. The important part he played in the development of the art-to-industry movement in Germany enabled him to become a leader of the movement in this country. He started the Bernhard style of poster design: the presentation of a subject through the fewest possible elements.

As a designer of type faces—the Bernhard Gothic, Cursive and Book—he is most widely known. He is under contract to the American Type Founders Company.

He prefers to be known as an architect, however. He has designed many apartment and office interiors, and storefronts, as well as furniture.

LUCIAN BERNHARD . . .

Architect, decorator, poster and type designer

Mr. Bernhard has designed the new cover of The Architectural Record. He has also developed, together with the editorial staff, many of the new features in the format.

The problem of designing a magazine, like any architectural problem, presents many complexities. In this case, the method of approach has been that of the architect—to find a solution that is at once logical and pleasing. For this, Mr. Bernhard's training as an architect and experience as a typographical designer have made him doubly well qualified.

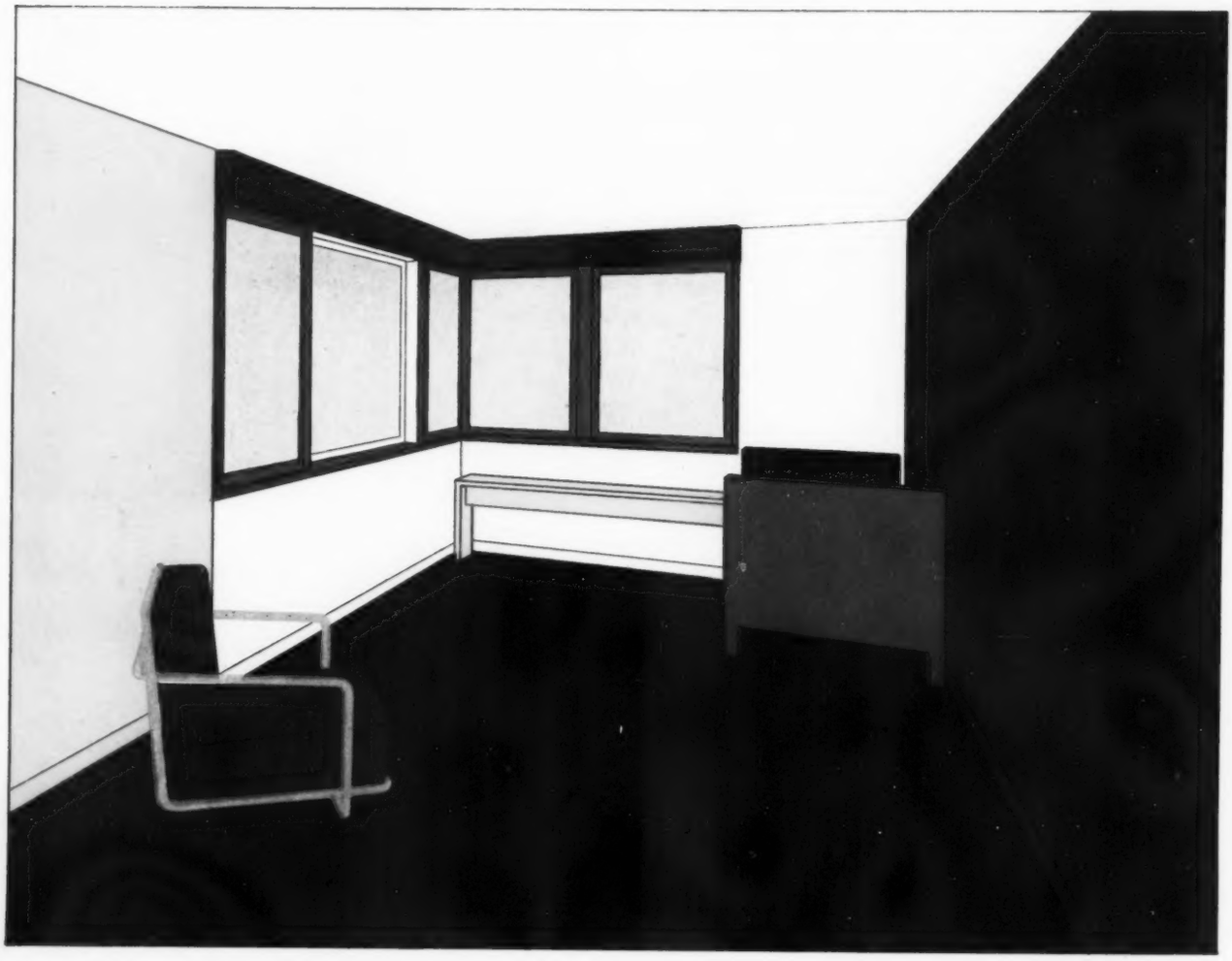
The cover design utilizes the advantages of camera art. Each month a new photograph, illustrating one of the features of the editorial section, will be selected. A sequence of six colors will distinguish the separate monthly numbers of each volume.

Another innovation is a larger page size for illustrations. This has long been felt necessary in order to display the Portfolio plates to best advantage. An increased width for the text columns, it was found however, interfered with the ease of reading. For this reason it was decided to introduce two varying page sizes—one for illustrations, one for text. The result, it is believed, is greater flexibility in editorial presentation.

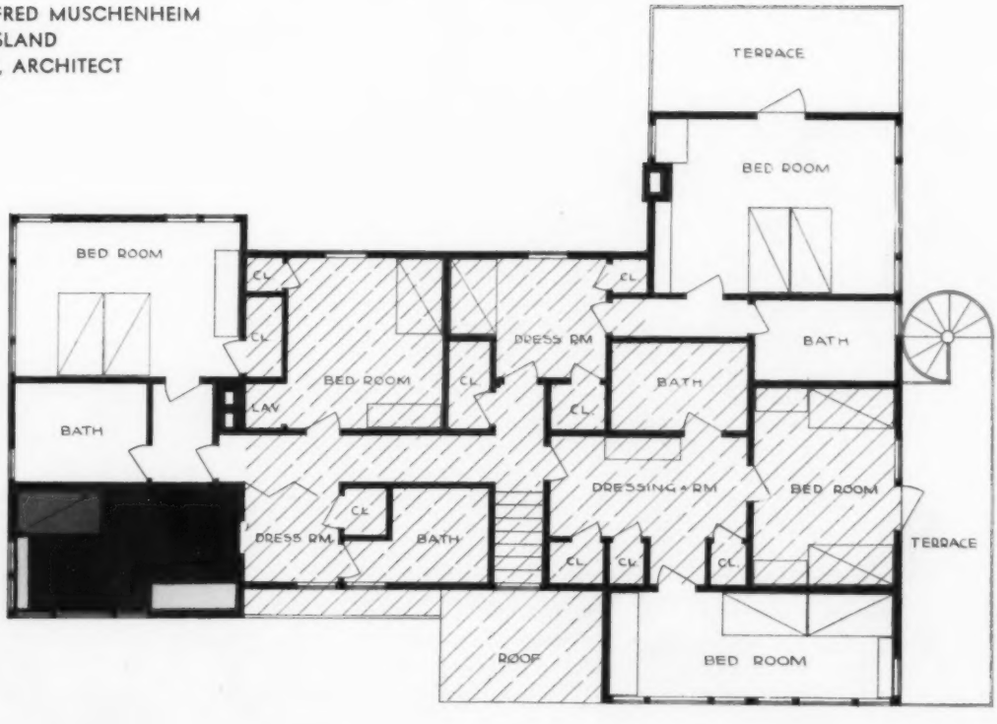
H. T. Carswell, Architect

NEXT MONTH . . . The Annual Country House Number

In addition to the many illustrations and working details of houses, there will be an article on the comparative costs of small house construction, by Henry Wright, architect; and an outline of procedure in developing low-cost housing communities. The Technical News and Research section will deal with the requirements of service buildings and equipment for country estates.



REMODELED HOUSE OF FRED MUSCHENHEIM
HAMPTON BAYS, LONG ISLAND
WILLIAM MUSCHENHEIM, ARCHITECT



SECOND FLOOR

Notched area indicates plan before remodeling. Color treatment of the remodeled rooms is described in this issue.

THE ARCHITECTURAL RECORD OCTOBER, 1931
VOL. 70 — No. 4

A MODERATE RENTAL HOUSING PROJECT IN PITTSBURGH

By Charles F. Lewis

Construction of 128 houses—the first unit of a model community of 300 homes—has been begun in Pittsburgh by the Buhl Foundation.

The project is regarded by the Foundation as a demonstration:

First, that low cost housing offers a sound medium for the investment of endowment or other trust funds without unusual risk to the principal and without sacrifice of income. It is hoped thus to show that it is possible to make philanthropic funds do double duty.

Second, that with advanced standards of house design, community planning, and financial and operating management, stimulus may be given to the movement for large scale housing operations, not only in the Pittsburgh district, but generally throughout the country.

It was recognized from the beginning that if the project were to have any value at all it must be commercially successful. While the Foundation is limiting itself to a net return of approximately 5 per cent, the project is in no sense philanthropic. Commercial practicability, within the limits of the return set, is regarded as the very essence of the program.

Confidence that the undertaking is reasonably assured of success from the start arises in part from the present favorable market for building, but chiefly from the series of economic, sociological, engineering, site planning and architectural studies that have been conducted over a period of three years. The first year was devoted to a study of the experience of other foundations and underlying factors governing investment and disbursement policy. The second year developed an inquiry into limited dividend housing experience in other cities. The third year brought a series of intensive studies of the opportunity for a large scale housing demonstration in Pittsburgh.

The same procedure may or may not be applicable in another city or another situation. It is believed to have been adequate for the Buhl Foundation's present program, and of possible interest to groups contemplating similar commitments elsewhere.

Buhl Foundation Research in Human Welfare

When Henry Buhl, Jr., Pittsburgh department store owner, died in June, 1927, he left the bulk of his estate, about $13,000,000, to establish for philanthropic purposes the Foundation bearing his name. He named a self-perpetuating board of managers, empowered them to expend principal or income for such public-spirited purposes as they might see fit to support from time to time. A year later the Foundation was organized and began

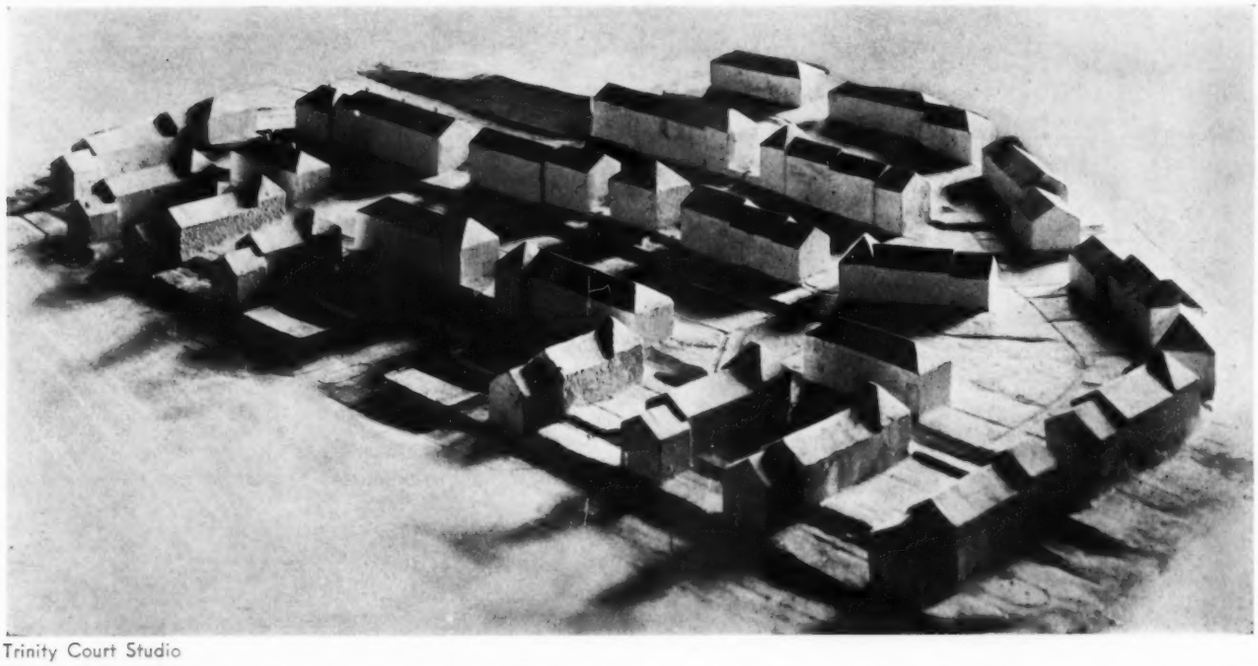
HOUSING—A NEW FIELD OF PRACTICE OPEN TO THE ARCHITECTURAL PROFESSION

Architects design about 67.8 per cent of the yearly dollar volume of new buildings constructed. In 1928 —a more typical year than 1929 or 1930—the total value of buildings (exclusive of public works and utilities), for which contracts were let in the 37 Eastern states, was $5,290,355,600, of which $3,584,881,600 was planned by architects while $1,705,474,000, or 32.2 per cent, was erected from "private plans."

This substantial volume of private-plan work represents, it would seem, a prospective new field of practice for architects. It has never been fully analyzed with a view to determining how much of it should in the public interest be designed by architects. However, a good part of it is known to consist of buildings planned as suburban real estate developments.

In the Buhl Foundation project, which is now being built, the success of the enterprise has been assured by a thorough investigation of the building trends and needs for new housing in the Pittsburgh district, as well as by a careful analysis of costs. The preliminary survey which was made is described in the accompanying article by Mr. Lewis, director of the Buhl Foundation.

The procedure followed by this survey and the topics covered are suggestive for other communities where similar investigations are indicated.



Trinity Court Studio

AIR VIEW OF MODEL—Buhl Foundation Housing Project
Which is Now Being Built in Pittsburgh
STEIN AND WRIGHT, Site Planning Consultants
INGHAM AND BOYD, Architects

a series of intensive studies intended to establish sound bases for philanthropic policy. The experience of the principal older foundations was studied in detail, and efforts were made to chart leading opportunities offered for advancement of human welfare. Already, out of income, grants have been made totaling more than a million and a quarter dollars, chiefly for fundamental research projects in the social and natural sciences.

From the first, however, the Foundation was impressed with the desirability of investing its funds to serve a direct constructive social purpose, and it early turned to housing as one of the outstanding social challenges of the day that offered an avenue for this kind of investment.

As a ruling principle of its housing studies the Foundation has sought to avoid accumulating a mass of material that could be digested with difficulty, if at all. Rather, it has attempted to study each problem in its broad aspects to determine which questions required answering.

Study of Other Housing Projects

Limited dividend housing operations in other cities were studied on the ground, particular attention being paid to the City Housing Corporation projects at Sunnyside and Radburn, the Rockefeller cooperative apartments, Mr. Rosenwald's Michigan Boulevard Gardens in Chicago, those of the New York Housing Board, as well as the war-time housing experience and some of the leading undertakings of the insurance companies.

In each case definite answers were sought to the following questions, among others: How do these projects differ, (a) as to purpose and (b) as to types of housing? What economic levels do they attempt to reach? Have these demonstrations actually reached those groups for which they were built? What effect has better housing had upon the occupants, and upon neighboring districts? Are these enterprises successful financially?

It was decided, early in the summer of 1930, that the limited dividend housing projects had, on the whole, sufficiently demonstrated their possibilities to indicate that investment in the stock of a well-managed housing corporation might, under favorable circumstances, offer opportunity for wise employment of foundation capital funds. The question was then asked, "Does such an opportunity exist in Pittsburgh?"

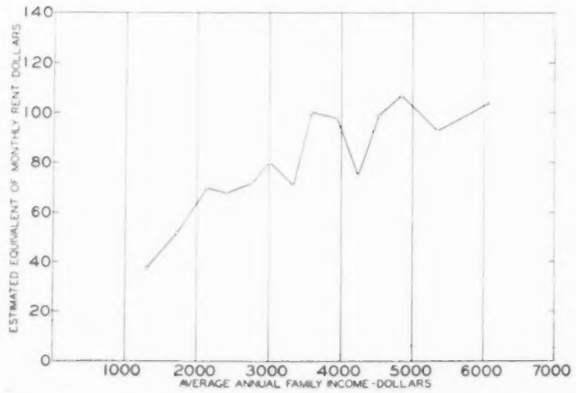
Rental Program Found Desirable

At first the Foundation endeavored to learn if it might be practicable to build free-standing single houses for sale within the reach of the $2,000 to $2,500 a year income class. The studies indicated clearly that this could not be done. On the contrary, they led steadily and irresistibly to the conclusion that a more important opportunity could be found in building garden homes for rental, particularly to the $2,200 to $3,600 a year income group. More amenities at lower cost and a far greater degree of social and economic security were found to be possible under a rental than under a home-ownership program.

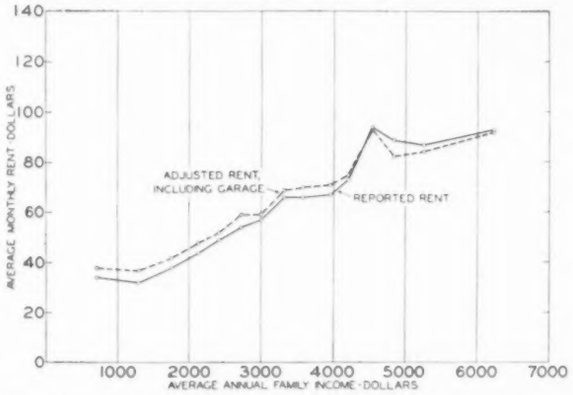
Survey of Conditions in Pittsburgh

The general study of the Pittsburgh district was conducted under four major heads:

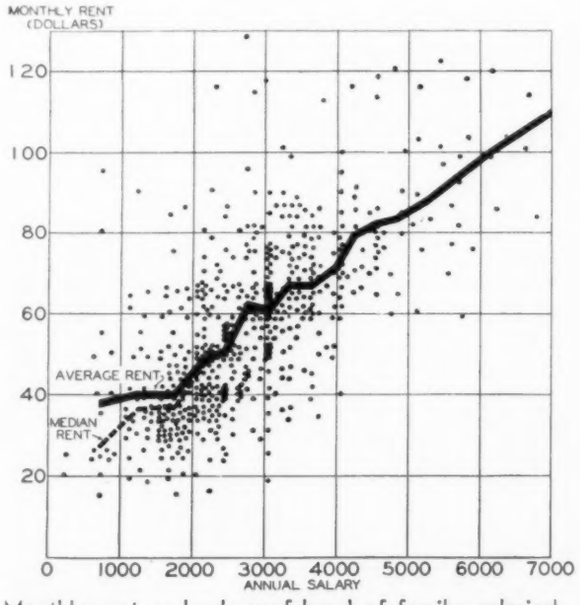
(1) The *market* was examined to learn, if possible, whether houses in the contemplated price range might be readily sold or rented.



Monthly cost of owned homes and family income (salaried workers employed in downtown Pittsburgh living within the city). The rental equivalent of the owned home has been calculated at 12 per cent per annum.



Monthly rent and family income: salaried workers employed in downtown Pittsburgh living within the city. In each case reported rent has been adjusted to a figure that excludes heat, light, and household service, but includes water costs.



Monthly rent and salary of head of family: salaried workers in downtown Pittsburgh, living within the city.

(2) The *needs for new housing,* in terms of house types, were examined.

(3) *Costs* were carefully calculated to determine if houses of the size and character contemplated could be built within the price range set.

(4) The city was checked carefully for *possible sites* of 25 acres or more suitable for housing from 200 to 300 families. Finally, the most attractive site was examined in great detail and a sociological and economic study of the environment undertaken.

These general studies were supplemented, of course, by careful site and house planning studies.

In general, the various phases of the inquiry were carried along concurrently. There was much overlapping in point of time, although roughly they may be said to have followed in chronology the order indicated.

Analysis of Building Trends

In studying the Pittsburgh market, the Foundation fixed for itself certain questions as points of attack. These were such as the Foundation's staff felt justified in setting up for examination, on the basis of observation, experience and the best local advice that could be had. They were also dictated, of course, by the nature of the problem that had to be solved.

The questions, for which the Foundation sought specific answers, were as follows:

(1) Is Pittsburgh a growing city with an assured future?

(2) Is the number of houses, proposed to be built in an average two-year period, small or large in comparison with the annual total of residence building?

(3) Is the Pittsburgh district over-built in the proposed price class?

(4) By producing (a) better houses at (b) lower prices than speculative or commercial builders now build, will a broader market than now exists be opened?

(5) Can the advantages enjoyed by limited dividend housing in other cities be enjoyed in some degree in Pittsburgh, through (a) lower financing charge, (b) better plan, and (c) large scale operations, at this time?

The study of population growth led to a detailed charting by wards and boroughs of population trends, in which the entire metropolitan district was considered. The factors which appear to have governed these trends of population over the last 20 or 30 years were weighed. It was found that the tendency of the city itself is to be less and less industrial and more and more commercial. Heavy industry continues to migrate to the rim of the district. On the other hand, the downtown business area grows wider and higher, year by year. Good evidence was found for believing that the rate of growth that has maintained during the last 20 years in the industrial district is likely to be projected for several decades in the future.

Various statistical studies were made to obtain a

QUESTIONNAIRE ON HOUSING

The questionnaire was sent by the Bureau of Business Research, University of Pittsburgh, to heads of families working in downtown Pittsburgh. From this survey the Buhl Foundation obtained a check on housing needs.

NOTE: All information furnished is held strictly confidential. This form contains no means for the identification of individuals.

Please read carefully, fill in the blanks, and mail in the attached envelope.

SECTION I

1. **Where do you live?** Pittsburgh Ward No. .....
   ....
   (Street) (Nearby Cross Street)
   or Borough Name.....
   or Township Name.....
2. **Do you own your home or rent?** Check one { Own ☐ / Rent ☐
3. **If you rent, what is the total amount of rent paid** { for the year? $..... / for one month? $.....
4. **If you built your own home:**
   What was the cost of the lot? $.....
   What was the cost of the building? $.....
   Does this cost figure include garage? Yes..... No.....
   If garage was built subsequently, what was its cost? $.....
   In what year was home built? .....
   If you purchased your home:
   What was the purchase price? $.....
   If garage was built subsequently, what was its cost? $.....
   In what year was home purchased? .....
5. **Is your home mortgaged?** Yes..... No.....
   a. What is the amount outstanding on the first mortgage? $.....
   b. What is the amount, if any, outstanding on second mortgage? $.....

SECTION II

6. **What type of dwelling do you live in?** Check one:
   a. Single ☐
   b. Double (party wall) ☐
   c. Duplex (one family above the other) ☐
   d. Double duplex (two families upstairs, two downstairs) ☐
   e. Row ☐
   f. Apartment house ☐
   g. Housekeeping rooms ☐
   h. ..... ☐
7. **Do you rent your home furnished** ☐ **or unfurnished?** ☐
8. **How many rooms does your home contain?** Total number ..... (not including bath)
   a. Bed rooms Number .....
   b. Dining Room, Yes.... No....
   c. Private bath, Yes.... No....
   d. Full-size Kitchen ☐ Kitchenette ☐
9. **What is the type of heat used in heating your home?**
   Type of furnace, check one:
   Hot air ☐
   Steam ☐
   Vapor ☐
   Hot water ☐
   Gas stoves in rooms ☐
   What fuel is used, check one:
   Coal ☐
   Gas ☐
   Oil ☐
   ..... ☐
   ..... ☐
10. **How many persons are there living in your home?** .....
    Wife, Yes .... No....
    Number of children under 16 .....
    Number of children 16 and over .....
    Number of other relatives .....
    Number of other persons .....
11. **What is your age?** ..... years.
12. **What form of transportation do you usually use?** Check one:
    Street car ☐
    Motor bus ☐
    Railroad ☐
    Private auto ☐
    Inclined plane ☐
    Walk ☐
    ..... ☐
    How long does it usually take you from home to work, using the medium of transportation checked above? .... minutes.
13. **If you rent, does your rental include the following?**
    a. Gas, Yes ☐ No ☐
    b. Water, Yes ☐ No ☐
    c. Electricity, Yes ☐ No ☐
    d. Refrigeration, Yes ☐ No ☐
    e. Heat, Yes ☐ No ☐
    f. Household services, Yes ☐ No ☐
    g. Garage, Yes ☐ No ☐

SECTION III

1. **What type of work are you engaged in?**
   Selling ☐ Clerical ☐ ..... ☐
   Accounting ☐ Executive ☐ ..... ☐
2. **What was the combined income of your family in 1930?** $.....
3. **What was your personal income in 1930?** $.....
   Of this amount, how much represented salary or earnings from your main occupation? $.....
4. **How much income, if any, was received for rooms or lodging (from children, boarders or lodgers)?** $.....

SECTION IV

1. **Why do you rent?** .....
   .....
2. **Why do you own your home?** .....

basis for determining whether the district could be expected to support an operation calling for the building of a community of 200 or 300 homes in a single year, especially if the community might introduce a number of novel and advanced ideas of design and plan. The information available at the office of the City Building Inspector and from F. W. Dodge Corporation, over a period of years, afforded the basic material.

Pittsburgh Not Over-Built

Traditionally, Pittsburgh has been regarded as a conservative city. This conservatism has been reflected in most lines of its business. Generally, it has not suffered from periods of acute inflation and recurrent despair to the extent that have some of the newer cities that are more nearly dependent upon the mercurial fortunes of particularized industries. Because of this conservatism Pittsburgh has not suffered from orgies of over-building in residential construction.

Rent levels, wage levels, living costs, statistics on family income and surplus were assembled. Painstaking tabulation of residential permits, mortgages filed and foreclosures over a period of years was made. The employment and business conditions in 1930 as compared with other years over a long period, and as compared with other cities at this time, were considered. This statistical material was interpreted in the light of competent Pittsburgh real estate and financial opinion.

As a check against prevailing belief that the city has not been overbuilt, Herbert Emmerich, vice president and general manager of the City Housing Corporation, New York, agreed to come to Pittsburgh to examine the site on the ground from the detached standpoint of an objective observer. Mr. Emmerich's conclusions sustained the interpretation already made.

Housing Needs of White Collar Class

After it had been decided that the most useful thing that could be done was to build particularly for the moderate salaried white collar groups of the "Golden Triangle," an effort was made to get a cross-section view of the economic and housing conditions of this group.

The Bureau of Business Research of the University of Pittsburgh, under Dr. Ralph J. Watkins, undertook to obtain this information. With the cooperation of a dozen leading corporations, it sent out questionnaires to about 4,000 clerical employes receiving salaries of $5,000 or less. These questionnaires, which were not to be signed, called for information in great detail as to salary and income, size of family, location and size of home, date of acquisition and cost of owned homes, rents paid, and accommodations provided. The response was exceptionally gratifying. Approximately 40 per cent of the questionnaires were filled in completely and returned. In this manner it was possible to chart where and under what conditions Pittsburgh's clerical workers now live and what their economic and social problems are in so far as they are related to housing.

Cost Analysis

The study of the advantages to be obtained from large scale operations led particularly to the second mortgage market and considerations of cost. Confidence that a large scale operation might safely be undertaken seemed to be justified.

In its search for the most suitable type of home for the projected community, garden apartments, duplexes and double houses, free-standing single houses and single houses in rows (group housing) were considered from the standpoint of their present popularity and apparent trends. This study took into consideration the fact that Pittsburgh is traditionally a city of free-standing single houses, a large percentage of which are owned. The single-family house in rows with party walls has never been sold in Pittsburgh. The city is without experience in cooperative housing ventures in the lower income group. Land and utility costs are comparatively high because of the rough topography, thus further limiting the choice.

As a final check against costs, and through the courtesy of the City Housing Corporation, an experienced building contractor was asked to estimate the cost of erecting, under Pittsburgh conditions, in groups, 130 houses of a typical Radburn design and according to Radburn specifications. This cost analysis was broken up in great detail and has been utilized as a check at every stage of the subsequent development.

Site Considerations

In the meantime, the search for sites had early narrowed consideration to the 45-acre Bigham estate, 400 feet above the city's business district, smoke-free, two miles by motor highway from the heart of the Triangle. The tract had never been sold or built upon, save for the manor house, since the day of its acquisition from William Penn.

This site was first studied from the standpoint of its adaptability to community planning. A large part of the area was overgrown and the slopes appeared to be forbidding. It was extremely difficult to guess how much of the acreage might be recovered for building operations. At this point Frederick Bigger, town planner of the Citizens' Committee on City Plan, Pittsburgh, rendered an invaluable service. Mr. Bigger carried his studies to a point that showed conclusively that at least 25 acres of the site could be profitably developed without excessive grading. His studies fully justified confidence in the possibilities.

Subsequently, the ward in which the property is located was studied from the standpoint of transportation, population, wealth and home building, and cultural facilities such as parks, homes, schools and churches. An intensive study was made of the community immediately adjoining the tract in order to obtain a social and economic cross-section of the environment.

Architectural and Planning Consultants

Clarence S. Stein and Henry Wright were retained to carry on preliminary studies of site plan and house design. In addition they directed the inquiry on costs and produced in final form the attractive site plan. They have continued as consultants to the Pittsburgh architectural firm of Charles T. Ingham and William Boyd, who have designed and planned in detail the houses of the community.

Future Development of Housing

In the meantime, the Foundation does not feel that its studies have been completed. These will be continuous as long as the operation of the community is in its hands. Attention is already being directed to subsequent units for development. Plans for management and operation of the 128 homes that will be ready for occupancy May 1, 1932, are now in the making.

Inasmuch as the Foundation's major objective is to stimulate other agencies, both in Pittsburgh and elsewhere, to undertake larger projects and carry them out successfully, it is hoped that out of this comparatively modest undertaking may come more significant studies of housing conditions and more aggressive action on wider fronts to meet the challenge of housing in America.

THE EVOLUTION OF THE SITE PLAN

The site chosen by the Buhl Foundation consists of a 45-acre wooded tract on Mt. Washington, two miles from the heart of the Pittsburgh business district; which can be reached within 7 minutes by automobile and 21 minutes by street car.

The ground has never been developed. It is part of a manor farm retained by William Penn when he turned over the territory to the state. The remainder of the farm, which once covered the whole mountain top, has been built into a home-owning community of a non-industrial and non-commercial character. This developed area nearly surrounds the Buhl property.

Nearby are grade and junior high schools, several city parks with playground facilities, a Carnegie Library branch and churches of various denominations. A strong civic pride and a closely knit community life already exist in the district.

Questions Involved in the Planning Studies

The problem of developing the site, as given to the architects and planning consultants, was two-fold:

(1) To see if it is economically practical to build an attractive community of substantial and desirable homes for clerical workers of limited income at a sales or rental price within the workers' means and at a limited return to the Foundation.

(2) To demonstrate efficient methods of planning dwellings on a typical Pittsburgh hillside property.

In the course of the planning studies the problem resolved itself into the following questions, to which definite answers had to be found:

(1) Can an economical and desirable housing development be carried out on the property within the reach of moderate-salaried families?

(2) What is the maximum amount of the property which can be developed without excessive cost?

(3) What is the best arrangement and grouping of houses in relation to the site, to the other houses and to open spaces?

(4) What types of houses are advisable, considered in relation to both the need of those whom the Foundation wishes to help and the question of economy of construction on the chosen site?

(5) What is the most serviceable and economical layout of streets?

Influence of Sunnyside and Radburn

The experience of Stein and Wright, the planning consultants, in building Sunnyside Gardens, Long Island, and Radburn, New Jersey, was a development of planning ideas on which the answers to these questions have been largely based and on which the community scheme for the Buhl Foundation has been founded. In these two American architect-planned communities, built by the City Housing Corporation, the relationship of streets, houses and garden areas had been studied in detail.

In developing Sunnyside city conditions had to be met. The existing street system had to be retained, although it was admittedly wasteful. However, when it was decided to place the garages not in the block interiors as customary but in isolated groups on the rim of the community, the resulting openness of the city block, even though only 200 feet deep from street to street, suggested to the planners the idea of an internal common park area. This was done.

In the first unit of houses built at Sunnyside the same brick was used on both back and front, but the living porch remained on the street side, with

only a small kitchen porch toward the interior court. In later plans the living porches were also turned toward the park, and here was centered the outdoor life of the community.

Other difficulties were still inherent in the usual arrangement of city streets. Mothers were fearful that their children would be run down by the heavy traffic speeding along these streets. So, when Radburn came to be planned, the necessity of meeting the human problems of noise and danger accompanying the convenience of the automobile was recognized.

The open farm land chosen as the site allowed the architects to design the street plan as well as the houses. Instead of fitting the houses to existing lot and street lines, they were able to attack the problem as a complete city development. A "super block" was the result. The central garden park was enlarged and expanded into a continuous parkway.

All houses in Radburn are planned "back to front," with the services to the street and the living quarters toward the garden courts. All pedestrian lanes are safely segregated from motor traffic. The number of traffic streets and intersections are few, and the majority of the houses are placed along quiet closed-end lanes. A system of inner block pedestrian ways passing over or under all traffic streets link the super blocks into a chain of connected parkways. On these inner paths the children can pass from their homes to school or play without dodging motor trucks. Radburn, it has been said, is a town "for the motor age," a town turned outside-in.

The Pittsburgh Community Plan

In the Buhl Foundation project city limitations again have had to be met by the planners. The Pittsburgh community scheme, as described by Mr. Wright, is "a Radburnized Sunnyside." At the same time, it solves the additional problem of a hillside site.

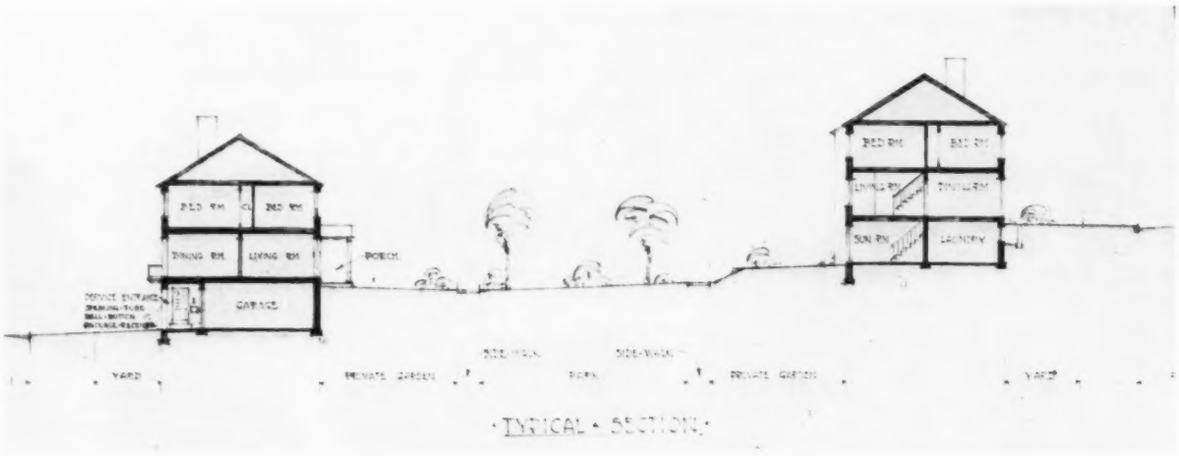
Less than 30 per cent of the entire tract of 45 acres will be occupied by homes, and the remainder will be landscaped to provide large central parks running through the property. Each dwelling will have its own lawns and gardens. The parks and playgrounds equipped for young children are to be maintained permanently by the Foundation.

The street system is planned to provide safety for pedestrians. Vehicular traffic is reduced to the motor cars of those who will live in the community.

The first group of 125 houses, which will be ready for occupancy by May 1, 1932, will have five and six rooms on two floors. They will be built in units of from two to eight houses separated by soundproof party walls. Plans provide the houses will face away from the streets toward the central parks.

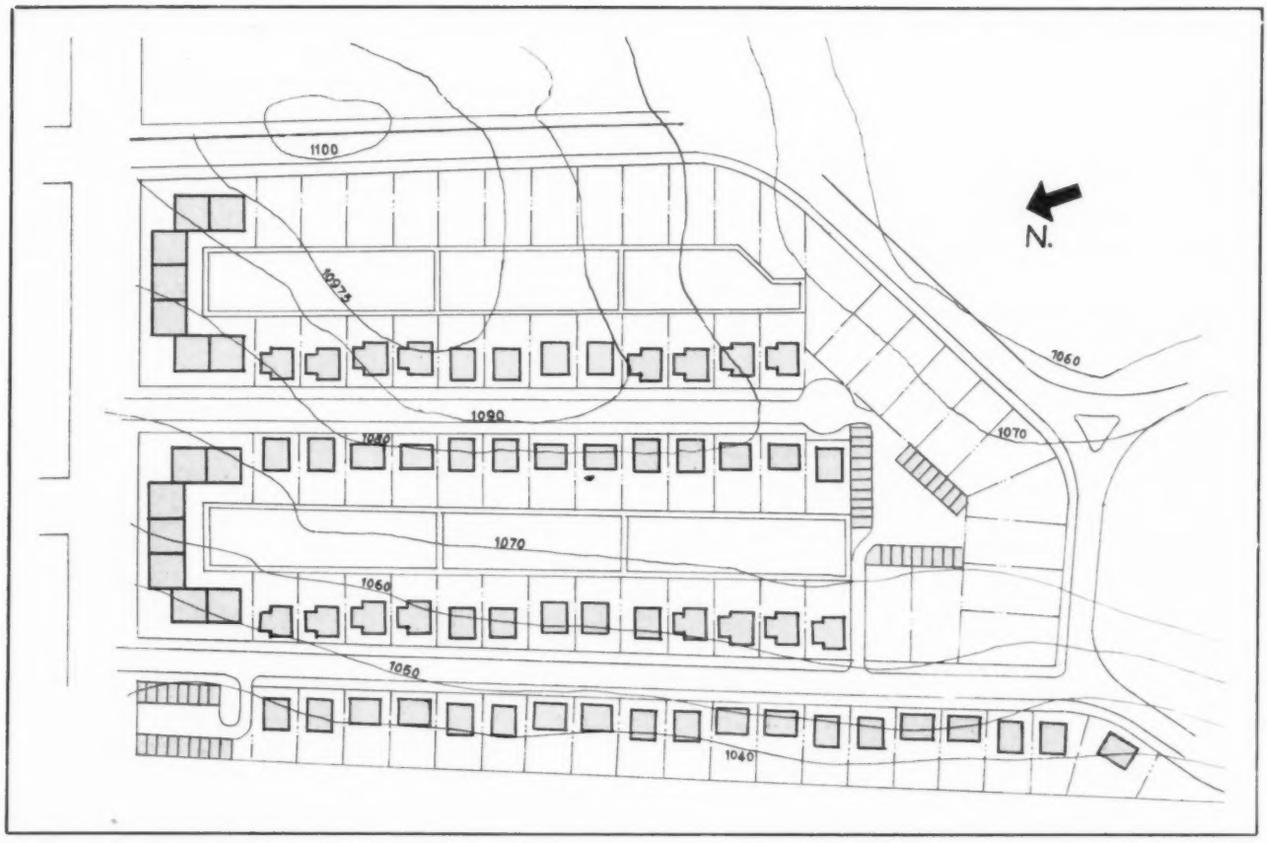
Natural contours are utilized. Sharp ridges are being cut down to provide wide terraces on which the houses will stand. Only a few steps will be necessary to pass from one terrace to the next. This stepping down of the houses will increase the distribution of light and provide a maximum of freely circulating fresh air. No roof terraces are planned since ample space will be provided on the ground for all tenants.

Each house will have a finished basement with laundry and an independent heating plant. Fireplaces will be provided in living rooms. All floors are to be of hard wood. Baths will have built-in tubs and showers. Kitchens will be equipped with permanent fixtures, including electrical refrigeration. Many of the houses will have sun parlors or private garages. Garages for smaller houses will be built in groups at convenient places.



Natural contours are utilized in providing wide terraces for the houses. Foundations serve also as retaining walls. Stepping down the houses increases the distribution of light and provides a maximum of freely circulating fresh air.

BUHL FOUNDATION HOUSING PROJECT IN PITTSBURGH
INGHAM AND BOYD, ARCHITECTS—STEIN AND WRIGHT, PLAN CONSULTANTS



BUHL FOUNDATION HOUSING PROJECT
IN PITTSBURGH
STEIN AND WRIGHT, PLAN CONSULTANTS

Detached House Plan (Scheme B). This solution provides 80 six-room houses which could be sold at an average of approximately $10,500.

THE PROBLEM OF BUILDING COSTS AND RENTALS

The comparatively steep hillside of the Pittsburgh site presented special problems of development to the planners. Fairly heavy grading was necessary in order to produce a condition susceptible to large-scale building.

About 25 acres out of the 45 available, it was found, could be economically used for houses of the desired income class. More land could have been used to provide a more expensive type of house, but this would have involved increased costs because of the difficult site conditions. The elimination of the undesirable land would not greatly increase the price per lot for the rest of the property. The low price of the land made this feasible, and so the parts not used for residential lots will be developed as parks and playgrounds.

Preliminary studies by Stein and Wright were made on the assumption that the sale rather than the renting of houses was preferred by the Buhl Foundation, and that for selling in the Pittsburgh district free-standing houses were desirable.

Preliminary Studies

Four schemes were developed for a specific section of the Buhl property, known as Area II and consisting of 365,000 square feet. Three of these schemes (A, B and C) provided for 74 to 80 six-room free-standing houses which, it was found, could be sold for $9,500 to $12,000, or an average of approximately $10,500. The fourth scheme (D) provided 128 row houses which, it was found, could be sold between $7,860 and $9,042.

A comparative analysis of the estimated total costs of typical detached houses and row houses, including site costs for the two types based on the same house plan, is given in Table I.

Practically the same total costs for land, grading, parks and public improvements were found for each of the four schemes. Because of the greater number of row houses, however, the site cost for the individual house unit in Scheme D was greatly reduced. The cost per house in this scheme aver-

Interior Row House Plan (Scheme D). The 128 row houses, it was found, could be sold between $7,860 and $9,042.

BUHL FOUNDATION HOUSING PROJECT
IN PITTSBURGH
STEIN AND WRIGHT, PLAN CONSULTANTS

aged $1,225 as compared with $1,834 to $1,948 for the free-standing houses.

Additional savings in the case of the row houses came from utilizing the retaining walls of the graded slope as foundation walls for the dwellings, as well as through the replacement of finished exterior walls by party walls.

TABLE I

	Scheme B 80 Detached Houses P-5 227 Basement Garage	Scheme D 128 Interior Row Houses P-5-I 227—E Garage
Size	23′ x 26′8″	22′ x 26′8″
Cubage	18,400	18,400
Lot Size	37′6″ x 85′	22′ x 62′
a. Uniform Items	$1,350.00	$1,350.00
b. Cubage cost at 25.5c	4,692.00	4,695.00
c. Porches	400.00	300.00
d. Basement Garage	200.00	200.00
e. Exposed walls and Special Footings	100.00	100.00
f. Deductions	.....	600.60*
House Cost	$6,742.00	$5,985.00
Site Cost	1,900.00	1,225.00
Total	$8,642.00	$7,210.00
Margin 20%	1,728.40	1,442.00
GRAND TOTAL	$10,370.40	$8,652.00

*Two party walls instead of end walls.

Advantages of Row Houses

The row house was selected as being better adapted for renting than the detached house could be for selling, because of these factors:

(1) Free-standing houses are too expensive on any basis to meet the needs of the community.

(2) Row houses reduce costs sufficiently.

(3) Pittsburgh conditions indicate a preference for a renting policy, in so far as the row house is concerned.

The consultants were authorized to proceed with further studies of the row house scheme, using common garden areas within the blocks, as at Sunnyside, and with sidewalks separated from the roads, as at Radburn. These studies presumed a first unit of approximately 128 houses, a group of stores and 22 duplex dwellings, costing not more than $1,250,000.

Development of Two Garden Areas

Ten acres have been developed as Areas I and II. In the center of each of the two large blocks is a common park, surrounded by the small private

Trinity Court Studio

BUHL FOUNDATION HOUSING PROJECT
IN PITTSBURGH
INGHAM AND BOYD, ARCHITECTS

The architects, Ingham and Boyd, have designed and planned in detail the houses of the community. The site planners, Stein and Wright, continued as consultants after the preliminary studies on site and costs were completed.

Trinity Court Studio

The houses are being built in units of from two to eight houses, separated by soundproof party walls. Each house has a finished basement with laundry and an independent heating plant.

BUHL FOUNDATION HOUSING PROJECT
IN PITTSBURGH
INGHAM AND BOYD, ARCHITECTS

Contributing Factors to Low Costs and Low Rentals

1. Large-scale operations.
2. Present low level of material and construction costs.
3. Elimination of costly financing charges by financing entirely from the funds of the Foundation.
4. Intelligent planning and careful checking of all construction details before actual operations are started.
5. A reasonable and non-speculative return, no greater than through investment in conservative securities.
6. Small allowance for vacancies, since it is anticipated that low rentals will assure yearly continuous occupancy of all houses.
7. Selection of specially tested materials in order to reduce upkeep costs to a minimum.

gardens of the individual houses. All houses in both blocks face toward the gardens.

Only local traffic will be found in the street which separates the two blocks. For those walking within the blocks there will be complete safety from automobiles.

The early studies for Area II showed the difficulty of economically designing houses on the lower side of a road running parallel to the west side of the property. The plot layout was accordingly altered to reduce the number of down-hill houses. The road has been placed as close to the edge of the property as practical without undue expense for retaining walls. To the east of the road will be a series of cul-de-sacs with rows of houses grouped around them.

Standardization of House Designs

To achieve the advantages and economies of large scale construction, the houses have been designed to be built in short rows, of as few types as possible, and to fit the hillside sites with as little waste as possible. There are only four basic plan types, which are varied to meet site requirements. In 46 houses the garages will be in the basement. Where the ground slopes toward the garden and away from the street, a sun room or inclosed porch is placed in the basement.

The four basic house plan types:

P-14. A 6-room house, 20′ 6″ by 28′ 8″. A similar type previously developed (P-9) had a width of 18′ 6″, but according to detailed cost estimates the increase of 2′ in the width added only $191 to the cost of the house and unquestionably made its rental value much greater. (In the early plan studies a type labelled P-13 was also considered. This plan is identical with P-14 except that it is reversed in relation to location of road.)

P-10. A 6-room house, 20′ 6″ by 26′ 8″. This type was designed to be used on shallow lots and in conjunction with types P-11 and P-12.

P-11. A compact house, 16′ 8″ by 26′ 8″. This type was designed for the small family of small income. The first floor plan has two variants: in one there is a living room, dining room and small kitchenette; in the other a larger living room, a normal-size kitchen and a dining alcove. There is no basement garage.

P-12. A house, 17′ 8″ by 26′ 8″, consisting of living room, kitchen and dinette, two bedrooms and a bath, with a garage in the basement.

Preliminary Cost Estimates

To the actual cost of the land has been added a sum sufficient to defray the costs of preliminary studies, since these studies form the basis for the use of the whole property.

A detailed analysis of the cost of construction of the various houses was made by Stein and Wright. These figures, based on experience with similar house types at Sunnyside and Radburn, were checked carefully by detailed builder's estimates made by the W. T. Grange Construction Company. The two sets of estimates were found to be practically identical.

To the cost of site and dwelling also has been added 8% for carrying charges during building operations until May 1, 1932. The 8% is based on the following costs: interest on land investment for twelve months; interest on improvements for six months; taxes, fees, etc.

Annual Charges

A possible rental schedule for the project on the basis of preliminary estimated costs was also set up by Stein and Wright, based on conferences with Alexander M. Bing and Herbert Emmerich of the City Housing Corporation.

Two bases of annual charges were compiled: one of 13%, the other of 14% of total costs, including all overhead charges up to the time of completion of building. The various charges considered in arriving at the rentals:

13%	
Interest on complete cost	5½%
Taxes on complete cost (About 3% on building costs)	2¼%
Amortization cost (About 2% on building costs)	1½%
Management, maintenance, repairs	3¼%
	13%
Or	
Interest on complete cost	5 %
Taxes on complete cost (About 3% on building costs)	2¼%
Amortization cost (About 2.4% on building costs)	2 %
Management, maintenance, repairs	3¼%
	13%
14%	
Interest on complete cost	5½%
Taxes on complete cost (About 3% on building costs)	2¼%
Amortization cost (About 2.9% on building costs)	2¼%
Management, maintenance, repairs	3½%
	14%

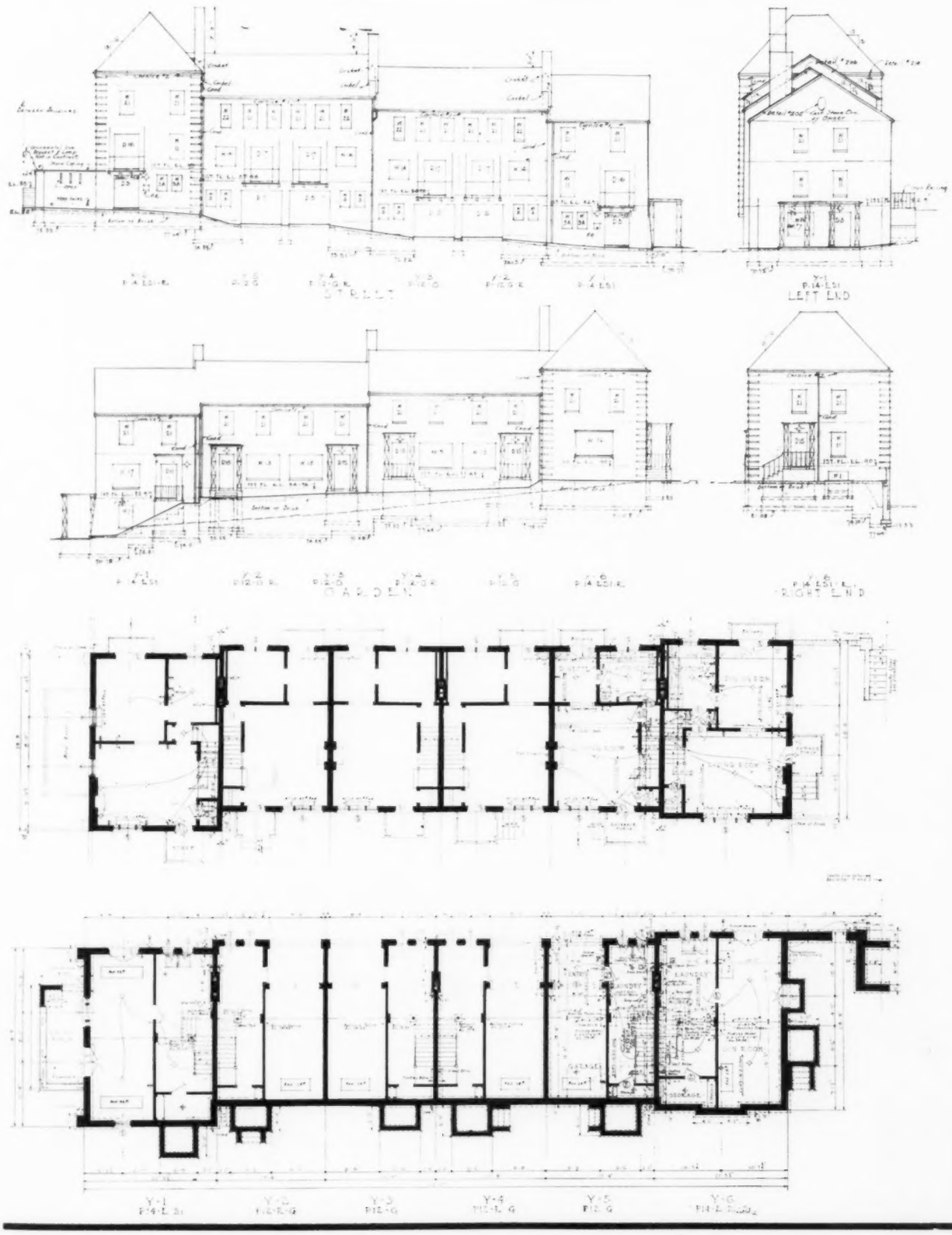
Subsequently, however, it is understood that the Foundation determined upon a set-up of annual charges slightly under 12%, but believed adequate, under the conditions, to provide a net yield of 5%.

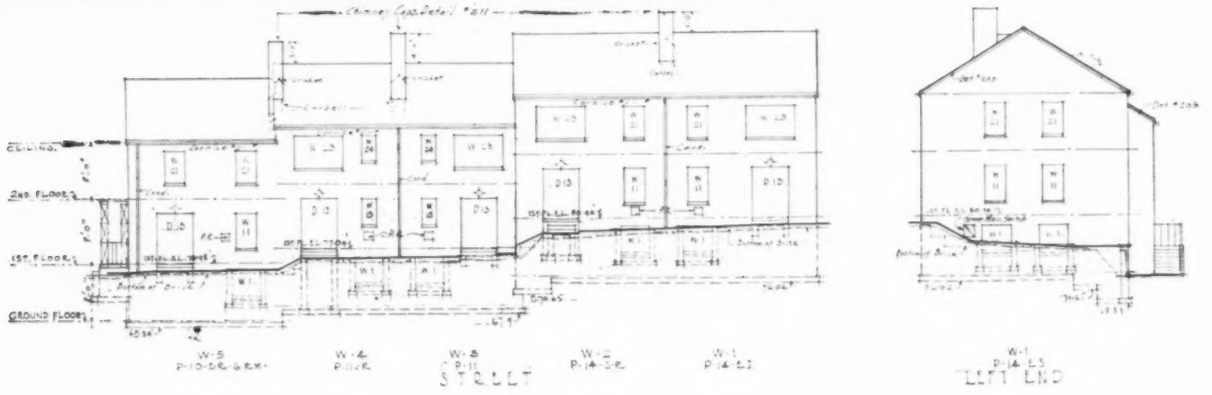
The expenses for repairs would depend largely on changes in occupancy. The smaller figure set up was based on the assumption that the tenants will not move often. In the Sunnyside apartments the costs of repairs, particularly for interior renovation, have been cut greatly by offering tenants a lower rental for a lease of three years. In this case the offering of reduced rentals would save much of an estimated $6,600 vacancy loss, thus giving an added return on the investment.

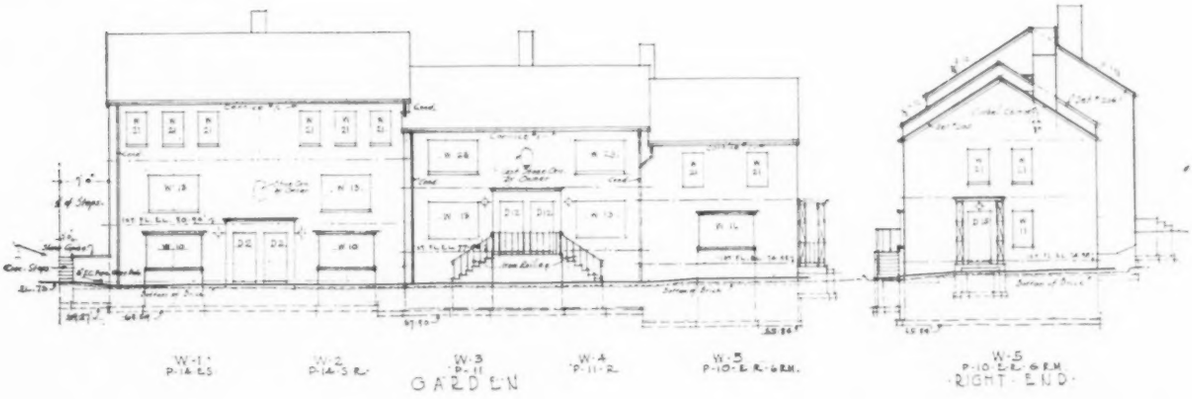
WORKING DRAWINGS AND DETAILS OF HOUSE UNITS

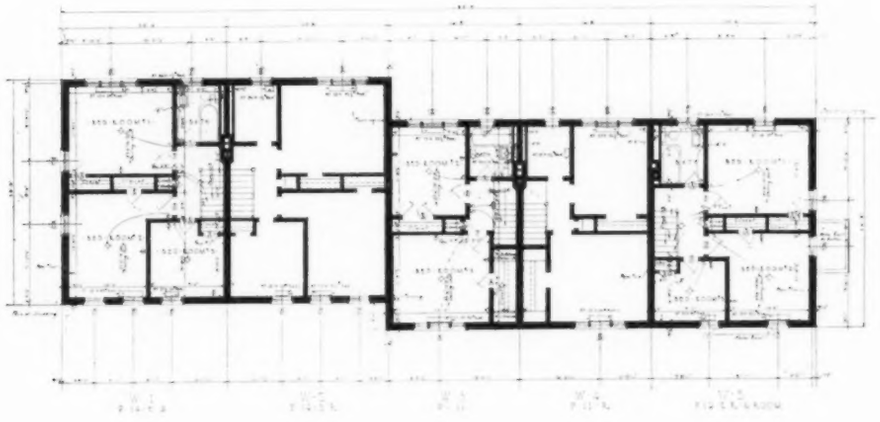
BUHL FOUNDATION HOUSING PROJECT IN PITTSBURGH

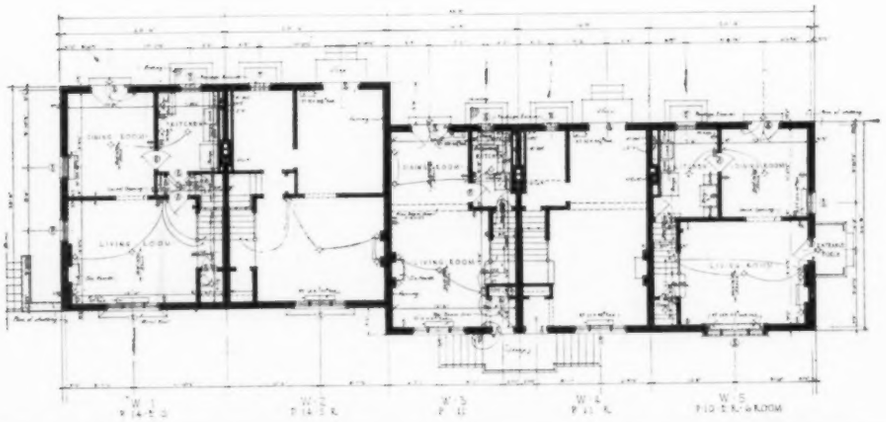
Ingham and Boyd, Architects







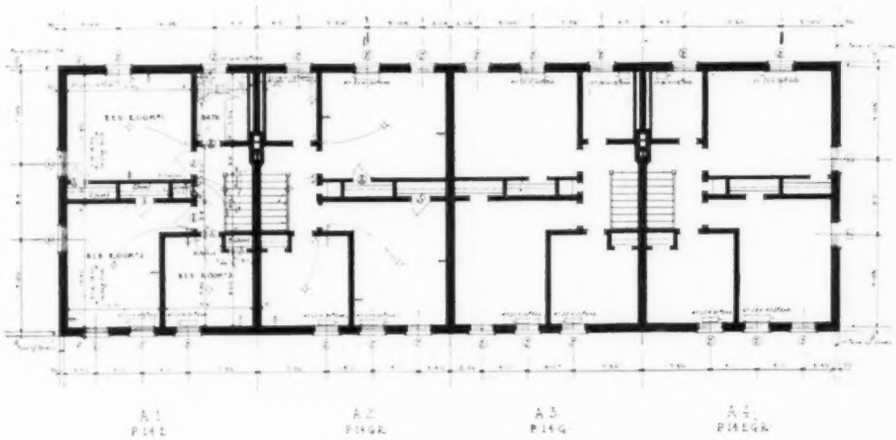


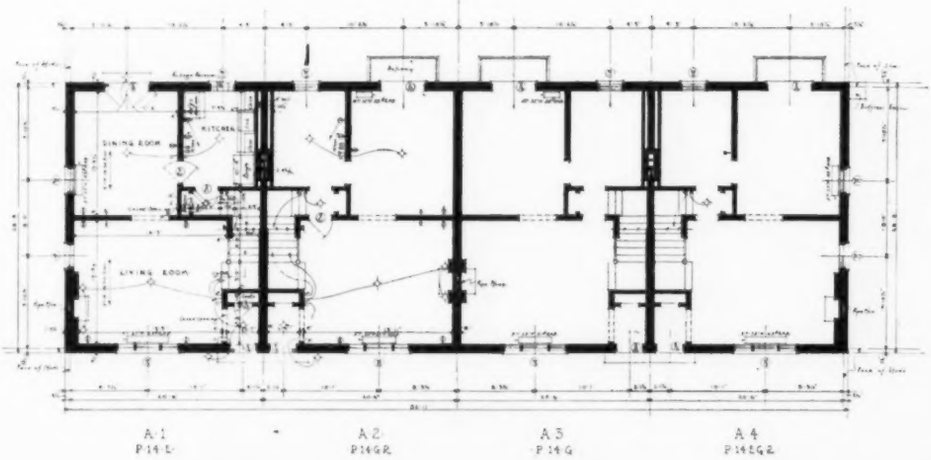


WORKING DRAWINGS OF A TYPICAL ROW HOUSE UNIT

BUHL FOUNDATION HOUSING PROJECT IN PITTSBURGH

INGHAM AND BOYD ARCHITECTS





WORKING DRAWINGS OF A TYPICAL ROW HOUSE UNIT

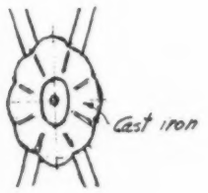
BUHL FOUNDATION HOUSING PROJECT IN PITTSBURGH

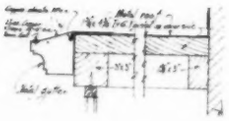
INGHAM AND BOYD ARCHITECTS

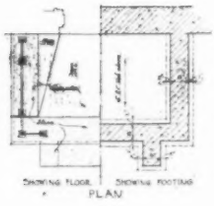
TYPICAL DETAILS

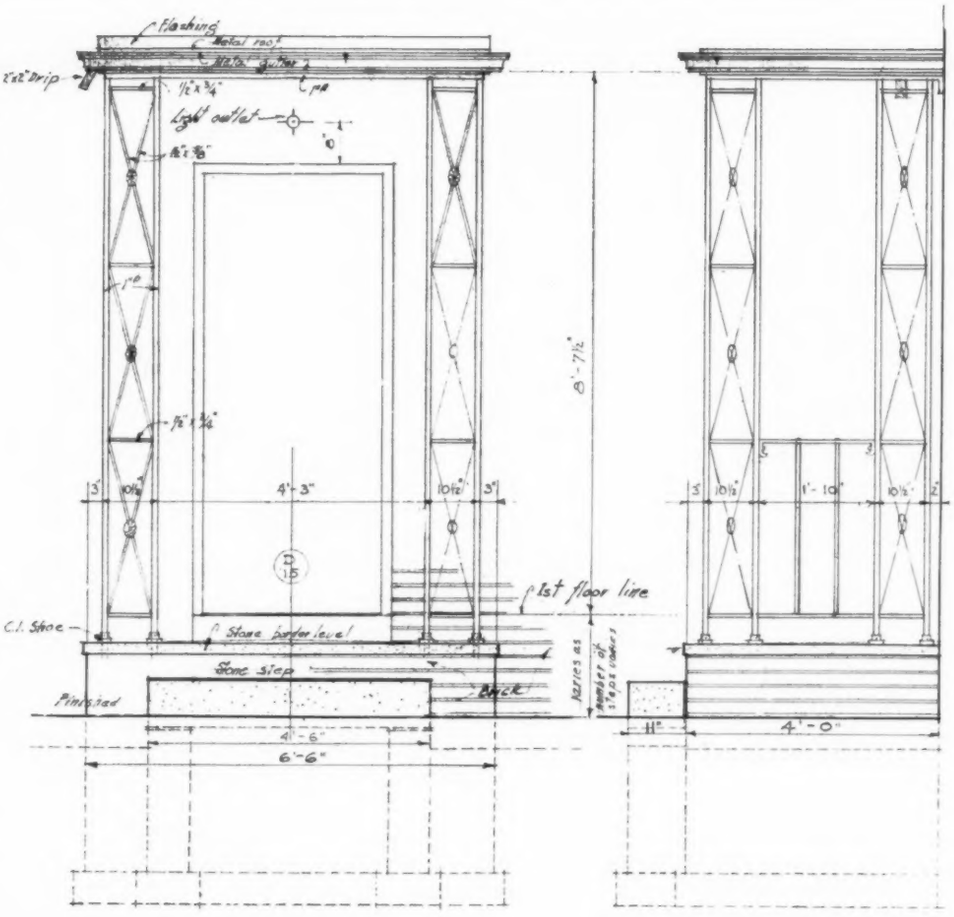
BUHL FOUNDATION HOUSING PROJECT IN PITTSBURGH

INGHAM AND BOYD ARCHITECTS

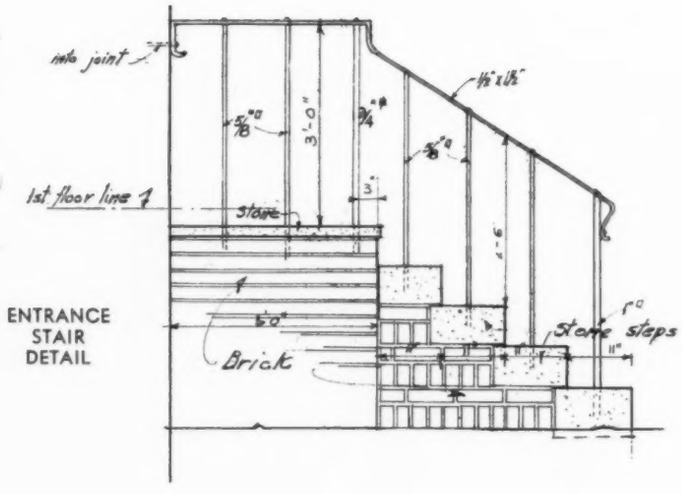


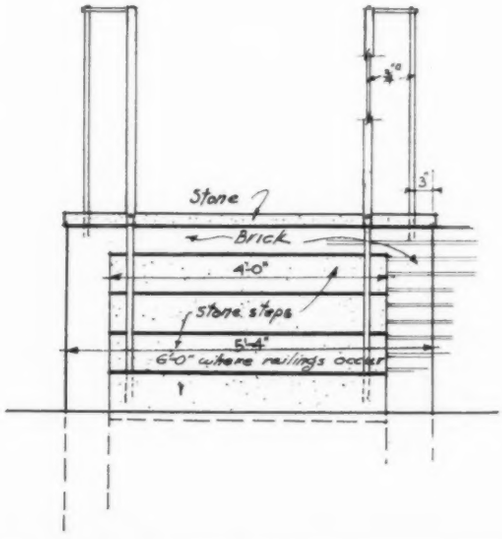


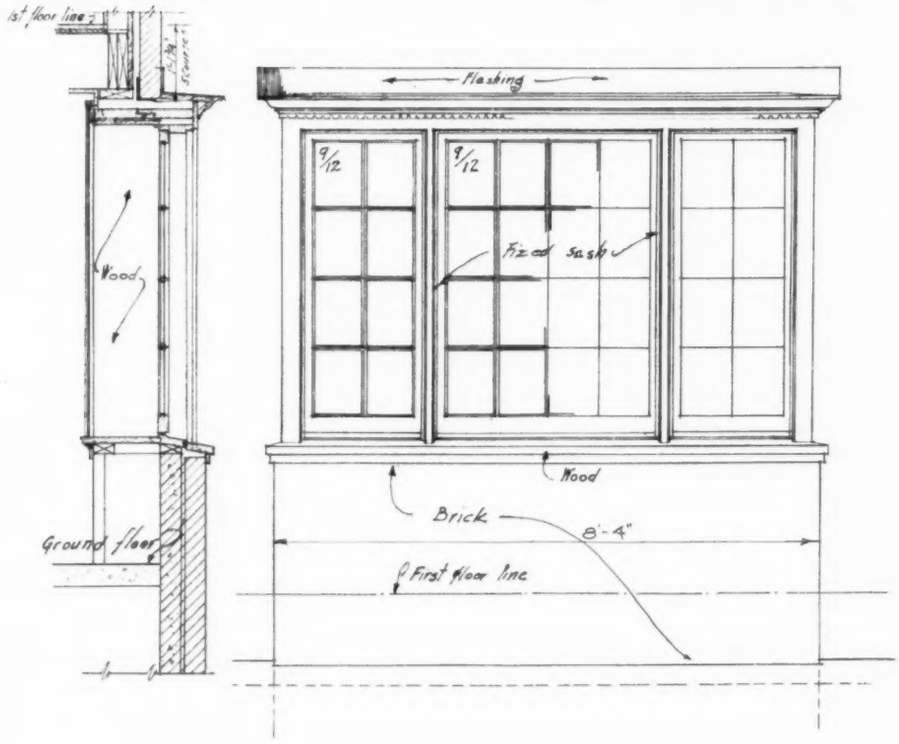




PORCH DETAIL—Aluminum is being considered for use as the grille.





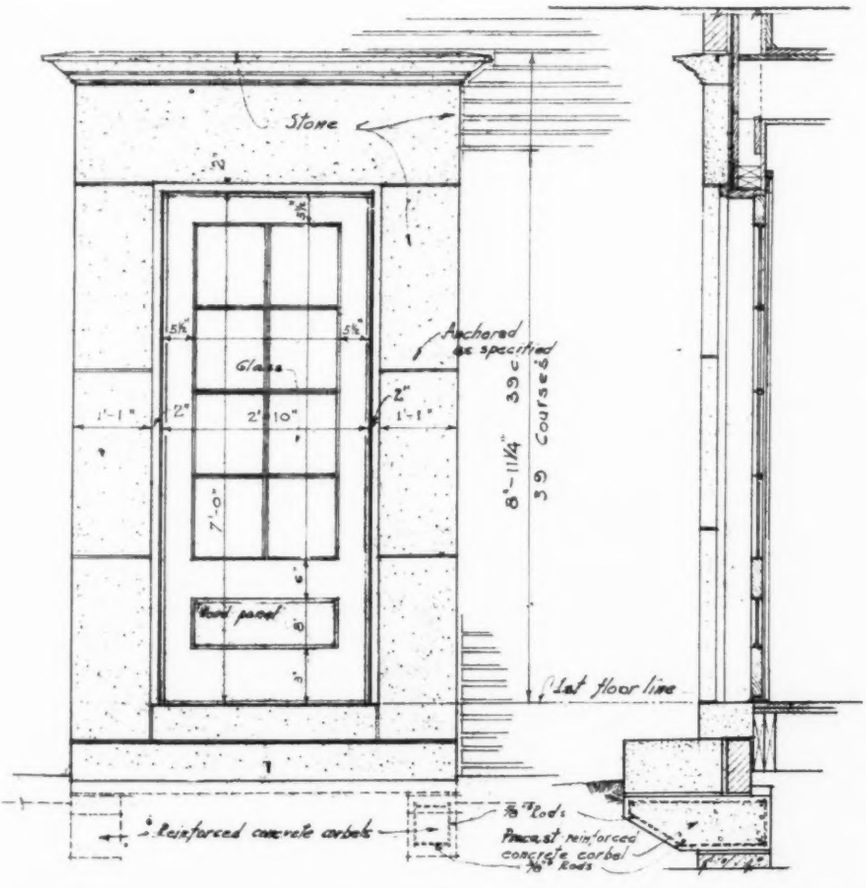


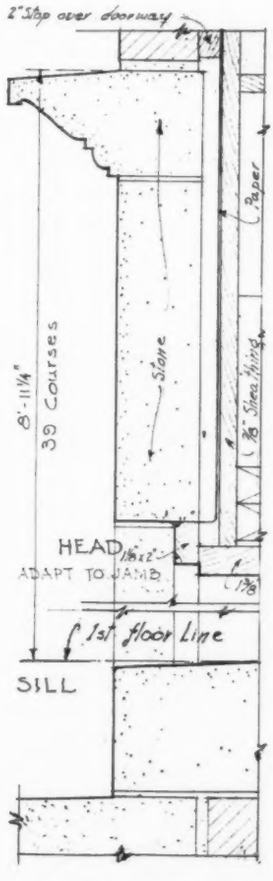
TYPICAL DETAILS

BUHL FOUNDATION HOUSING PROJECT IN PITTSBURGH

INGHAM AND BOYD ARCHITECTS

Left—WINDOW DETAIL
Below—ENTRANCE DETAIL

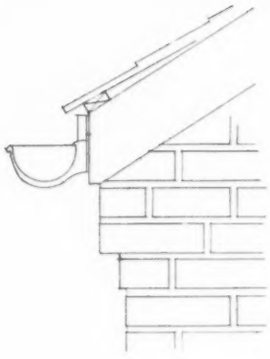


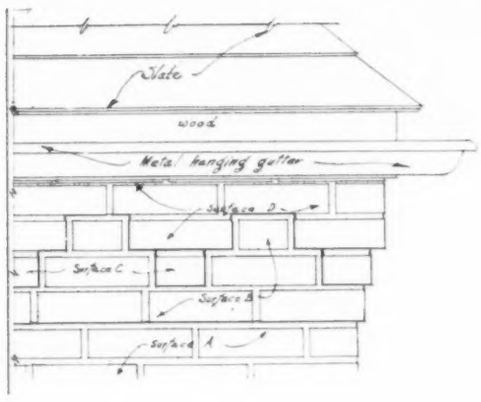


TYPICAL DETAILS

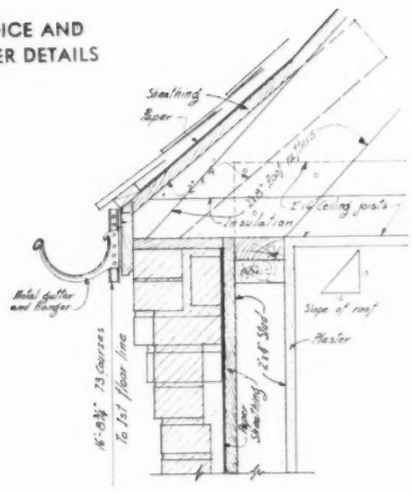
BUHL FOUNDATION
HOUSING PROJECT
IN PITTSBURGH

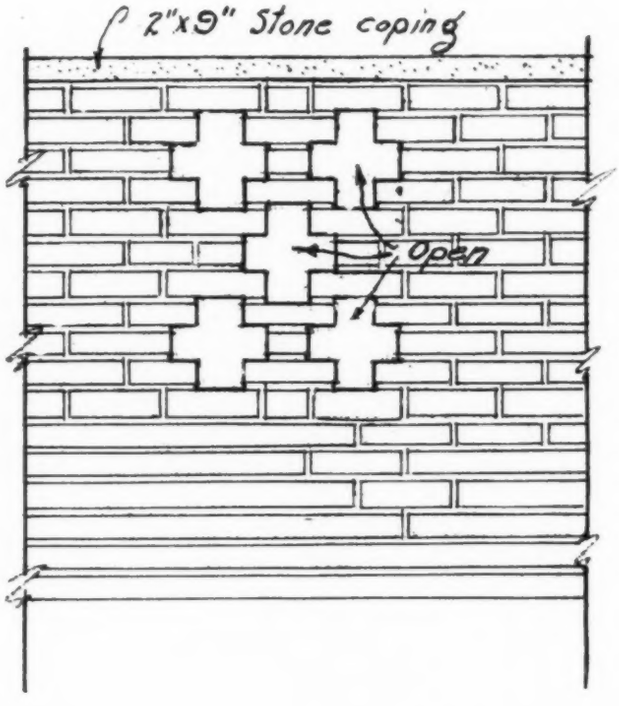
INGHAM AND BOYD
ARCHITECTS



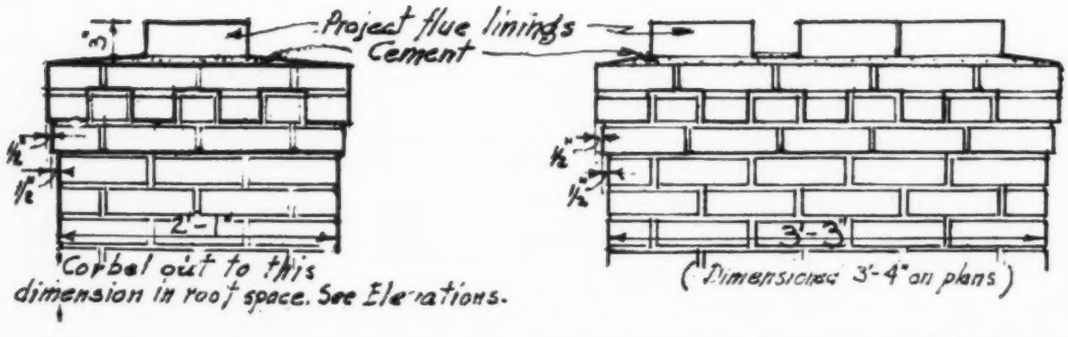


CORNICE AND
GUTTER DETAILS





CHIMNEY TOP DETAILS



UNEMPLOYMENT AND COMMUNITY PLANNING

By MICHAEL A. MIKKELSEN

Architects' emergency committees are again called upon to solicit funds and to distribute them so far as possible in return for useful work performed rather than as downright charity. To devise work that is at once useful and does not encroach upon labor actually or prospectively employed at normal wages is no doubt the more difficult problem, but it is certain to engage the best thought of relief committees because of its appeal to the finer humanitarian motives.

The plans for providing work tried by architects' emergency committees a year ago (information concerning the plans may be obtained from the American Institute of Architects) had one feature in common: they were temporary expedients. There was at the time no general expectation that the depression would last through another winter. This year more effort will be expended to devise work that while providing unemployment relief will also benefit the community as a whole.

Probably the greatest immediate need in every community is a statement of its economic situation to restore confidence in the soundness of its real estate values and of the factors upon which these values rest—commerce, industry, population, taxation and the like. What more profitable use to the community can be made of the trained ability of architects and draftsmen than to employ them, along with other specialists, in a comprehensive survey for the purpose of (1) disclosing economic conditions as they are and (2) working out an economic plan to safeguard and promote future growth?

Group Action to Restore Confidence

The belief that prosperity is a sure and prompt consequence of uncoordinated adjustments by individual concerns engaged in production, distribution and service has been largely abandoned. Instead, there is a growing conviction that supplementary group action is needed. The group, in the case of the building industry, comprises many subgroups, including architects, engineers, contractors, operative builders, real estate men, mortgage loan institutions, insurance and bonding companies, manufacturers, building material dealers, labor unions and so on.

Recognition of the need for collaboration by allied groups to deal with common problems is reflected in the organization of building congresses. The earlier of these were formed shortly after the war to consider such matters as jurisdictional labor disputes, apprenticeship policy, uniform contract documents, standard specifications and the like. However, the special problems created by the current depression have given a renewed impetus to the creation of building congresses. The majority in the following list are of recent origin and the formation of others are under consideration in Chicago, Cleveland, Detroit, and Northern California:

New York Building Congress, 101 Park Avenue, New York City. H. H. Murdock, Pres.

Oregon Building Congress, Buyers Building, Portland, Oregon. F. H. Murphy, Pres.

Philadelphia Building Congress, 17th and Sansom Streets, Architects Building, Philadelphia, Pa. H. J. Baringer, Sec.; Joseph J. Greenberg, Pres.

Boston Building Congress, 6 Beacon Street, Boston, Mass. Wm. D. Austin, Pres.

Indiana Building Congress, 229 Empire Life Building, Indianapolis, Ind. Robert C. van Amringe, Sec.

Indianapolis Building Congress, Architects and Builders Building, Indianapolis, Ind. Robert Frost Daggett, Pres.; K. B. McCann, Exec. Sec.

Memphis Building Congress, 110 Porter Building, Memphis, Tenn. M. H. Furbringer, Pres.

Westchester Building Congress, White Plains, N. Y. Hugh McDonald, Pres.

Central New York Building Congress, Syracuse Builders Exchange, 312 Hills Building, Syracuse, N. Y. K. D. Hequembourg, Sec.

Each of the subgroups in a building congress is affected by the degree of activity which prevails in the local building industry, but none of them is separately capable of influencing that activity. The building industry can operate only in so far as there is (1) a demand for new construction and for the reconditioning of obsolescent structures and (2) a market for real estate investments.

There has been enough overbuilding in spots and enough loss through worthless building bonds and shares to induce uneasiness about all real estate investments except those legal for trust funds. It is up to the combined real estate and building interests in each community to allay unwarranted distrust by an authentic presentation of the facts which laymen must have in order to invest their savings with discrimination. The experience of companies whose guaranteed mortgages and mortgage certificates are legal investments for savings banks and other trustees indicates that there is capital available for investments that enjoy public confidence.

Real Estate Surveys

That a real estate survey may be effective in restoring confidence is suggested by the experience of Buffalo. In October, 1930, the local real estate board reported a vacancy percentage of only 3.4 in residential buildings. During the ten months following the report contracts awarded for residential construction made a gain of $682,900, or 11 per cent, over the corresponding period in 1929 and 1930.

The decided slump which preceded the survey was succeeded by an immediate increase in November as compared with October, the city's residential building in October, 1930, amounting to $292,500, while in November it amounted to $328,500.

The favorable trend in residential construction maintained for ten months in Buffalo took a downward turn in August, 1931, presumably because the major part of the demand for new accommodations had been met or, possibly, because adverse business conditions developed from causes that had no direct connection with residential building demand in Buffalo.

Field surveys similar to that of the Buffalo Real Estate Board have been made in perhaps a dozen cities. Regardless of the effect upon building, they all provided authentic data of practical use to all lines of business in the community as well as to private investors.

The National Association of Real Estate Boards, 59 East Van Buren Street, Chicago, Ill., has published for its members an excellent pamphlet on *How To Make a Real Estate Market Survey*. The purpose of the survey, it is pointed out, is to present (a) an inventory showing the quantity of every class of real estate in the community and (b) the amount of vacant or unoccupied property in each class. The data obtained are tabulated under the following headings:

1. Dwellings.
2. Apartments and Flats.
3. Ground Floor Stores.
4. Office Space.
5. Hotel Rooms.
6. Vacant Land: Residential, Commercial and Industrial.

The surveys are advocated on the ground that they

1. Help to stabilize building operations.
2. Help to stabilize rentals and values.
3. Make real estate a more liquid commodity.
4. Facilitate subdivision and city planning.

The National Association of Real Estate Boards is an admirably directed body, exercising leadership in a many-sided business through intelligent fact-finding activities. It would be of inestimable benefit to the building industry and to the architectural profession if the member board in each city could be induced this year to undertake the kind of field survey which the Association recommends. Most boards would probably be willing to contribute the labor if the cost of publication is assumed by other interests. The secretary of the Association is Herbert U. Nelson.

Community Plans

The future of the building industry is conditioned by the growth in business, wealth and population of local communities, particularly urban communities; the ability of the industry to influence both the immediate and the long-time trend of building depends mainly upon the policy of local self-help individually adopted by such communities.

The era of pioneer conditions, when rising land values could be counted on to offset obsolescence in buildings, when business and population seemed to advance automatically, and when cities expanded with a minimum of planned effort, is undoubtedly past. Of the 377 cities with a population of 25,000 or more in 1930, some 23 per cent had lost population since 1920 or had stood still with a negligible gain of less than 10 per cent; six of the 25 leading cities were among those that had failed of a 10 per cent population gain.

Developments in power and in transportation, coupled with the rise of new industries and the decay of a number of the old, indicate a considerable redistribution of urban population; and the declining population growth rate of the country as a whole is certain to intensify the competition between cities.

It is inevitable that those cities which have the forethought to design an economic plan adapted to their natural advantages, and which invite trade and industry by superior conveniences at lower costs, are the ones that will prosper.

The local chamber of commerce is of course the logical agency to direct the collaborative work required, first, to make the economic survey and, next, to formulate the economic plan, but a large share of the work would fall within the province of the groups concerned with the real estate business and the building industry.

The key elements in the economic plan would probably be supplied by the association or chapter of architects, the real estate board and the group of title and mortgage companies. Architects would be especially well qualified to coordinate the studies related to rehabilitation of antiquated districts, provision of housing for the lower-income classes, planning of suburbs and municipal regulation of the development and sale of subdivisions.

An appeal for funds to be used both for unemployment relief and for conservation of community welfare is likely to bring a generous response: the gift ceases to be a donation and becomes an expression of gratitude for leadership in affairs of common concern.

GROUP PLANNING AND CITY RECLAMATION

In the last few years there has been constant discussion in the architectural press of the position of the Architect in the community. Tendencies have been noted to subordinate the architect to the engineer, and to make him a cog in the machinery of larger groups which will undertake the entire planning, financing and construction of buildings. In either event, the architect assumes a subordinate position.

Many architects accept this development as inevitable. On the other hand, there is a numerous group, who, although willingly admitting the cooperation of the architect with others in the formation of larger groups, still insists on the maintenance of his professional status and the predominant function which he has to fulfill in building operations. It is needless to digress on the first of these two points of view; sufficient has been written on the subject. As for the latter, those who hold this view do so, not so much out of a desire for personal or professional prestige, as from a conviction that the architect has a contribution to make to the building industry which, of its nature, is the prime factor in the picture. Instead of accepting the idea of restriction of his field of activities, they believe that his functions should be even wider. In order to maintain any such thesis it is necessary that the architect prepare himself to cope with certain problems, which, by and large, he has negelcted in the past. I refer to all those elements of our economic life which he has customarily left to others—financing, banking, taxation, land subdivision and city planning.

To be specific; I should like to suggest two subjects which distinctly challenge the architect—the problems of group planning and of city reclamation.

Group Planning

Ordinarily, the architect starts his consideration of a project after the land has been purchased. He is presented with a piece of property of limited dimensions in which to work. The result is that in every American city he designs buildings which, however beautiful, have no relation whatsoever to the neighboring buildings, except as a result of building codes and zoning ordinances. The lot which the owner has purchased may be entirely inadequate for the purpose for which it is intended. Inasmuch as the owner of the property has no responsibilities toward neighboring properties and can expect no consideration from their owners, his architect must adopt a "dog-eat-dog" attitude and develop that piece of property to the maximum advantage of the owner without any regard for disadvantages which may fall on the adjacent property. There is no moral turpitude involved. If he does not adopt this principle, his client will suffer.

Nowhere is this more apparent than in the construction of individual dwellings. As a usual thing, the division of land in outlying urban districts and many suburban districts is in narrow strips with a small frontage, frequently as little as 25 or 30 feet. With the necessary setbacks at the front and the sides, the plan of the building is forced into a more or less rigid mold. The house he has designed will have its front lined up with all the rest in the same block. The windows of one house will look directly into those of another over an intervening space of 12 feet. If, for example, every alternate house were set back further, the distance between opposite windows, instead of being 10 or 12 feet, would on a 30-foot lot be increased to 40 or 42 feet. But it would be useless for the owner to set his building back, because it would mean that instead of looking at the side wall of his neighbor's house, he will probably obtain a view of a messy back yard and of his neighbor's garage.

This whole method of anarchic development is doomed to certain extinction as soon as the public learns the evident advantages of group planning. It is the function of the architect to make these advantages known. Certainly the real estate subdivider and the speculative builder have not done so, nor have they shown any evidence that they even realize that it is better business for them. What applies to the individual home is also true in varying degrees of every other type of building which we erect. Here, then, is one field in which the architect may expand his activities.

Of course, group planning and building in large units means the disappearance of certain practices which have prevailed in the building industry, especially in land subdivision, where acreage has been bought speculatively and divided thoughtlessly into narrow strips without any consideration of what the result is going to be in the development of an eventual neighborhood, and with an eye only to a quick re-sale to small investors.

City Reclamation

This is a far more difficult subject. Every American city of any size has its blighted areas. Before the problem of their reclamation can be approached, it is necessary to know the history of the blighted districts and to understand the processes by which they can be reclaimed. It is easy enough for the city to expand into new territory, leaving its blighted areas as an increasingly sore spot within its territory. Such expansion, however, means the development of new streets, and new public utilities, added fire and police protection, while there are still districts in which these services are already installed, but which are unable to stand the burden of taxation to pay for them. How much better,

then, if these neighborhoods could be reclaimed. To do this is not sufficient to take a piece of property and tear down the old buildings and build new ones. Even a block will not answer the purpose. The only effective method is reclamation of whole neighborhoods. Here arise the questions of divided ownership and excess condemnation, as well as many other considerations. Inasmuch as these districts are not being improved as the result of commercial demand, it is obvious that their reclamation must be for special purposes and special needs of the city. Unfortunately these needs are in most instances not known. If, for instance, it is proposed to erect dwellings in reclaimed districts, it is necessary to know whether there is a need for additional dwellings, and if so, how many, for what tenancy and at what price.

Before projects of reclamation can be initiated in any city, there should be an extended research to determine these needs. In such a research the architect must play his part, together with the economist, the real estate expert, the builder, the tax expert and the banker. In this symposium the architect must rely on others for the determination of many of the facts, to which he must add that combination of skill and imagination which, by his training, he is capable of offering.

These are merely two of the many directions in which architects may expand their function. There are others which will suggest themselves. All of them, however, have one thing in common; they are things which will take the architect beyond the mere consideration of a building as a problem of construction and design, and tend to make it an expression of a community need and of the life of the people. This, I believe, is the path over which we must travel toward the development of an American Architecture that is not merely a fad of design or a glossary of cribbed motives, whether they be of ancient or modern origin.

EUGENE H. KLABER, *Architect*,
CHICAGO.

AN OPPORTUNITY FOR ARCHITECTURAL LEADERSHIP

IN view not only of the current depressed condition of building and the architectural practice, but particularly in relation to long-range social and economic needs, one of the outstanding opportunities for leadership, and incidentally employment, on the part of the profession lies in the field of housing, community development and related problems.

The outstanding need in this field is the development of a professional point of view which comprehends the vast possibilities of real group planning—planning in which the architect and those associated with him will refuse to be dominated by customary procedures, or by the conception of the individual house as the unit of planning. They will avoid the barren results of our familiar small-scale housing methods by approaching analytically each problem on the merits of its individual requirements and possibilities. Their results will show a coordination of the requirements of site planning and architectural planning, which have too seldom been brought together in the field of general architectural practice and even less in that of economic housing in the United States, although it is a well-developed field abroad.

An adequate conception of group planning is prerequisite to the production of economical and appropriate types of dwellings for the classes of people to be housed. Good solutions of the absolutely basic though generally unappreciated problems of effective land utilization, and the development of superior types of plans based on the elimination of restrictive and illogical land-subdivision—these too are wholly dependent upon the comprehension of group-planning of the sort we have in mind.

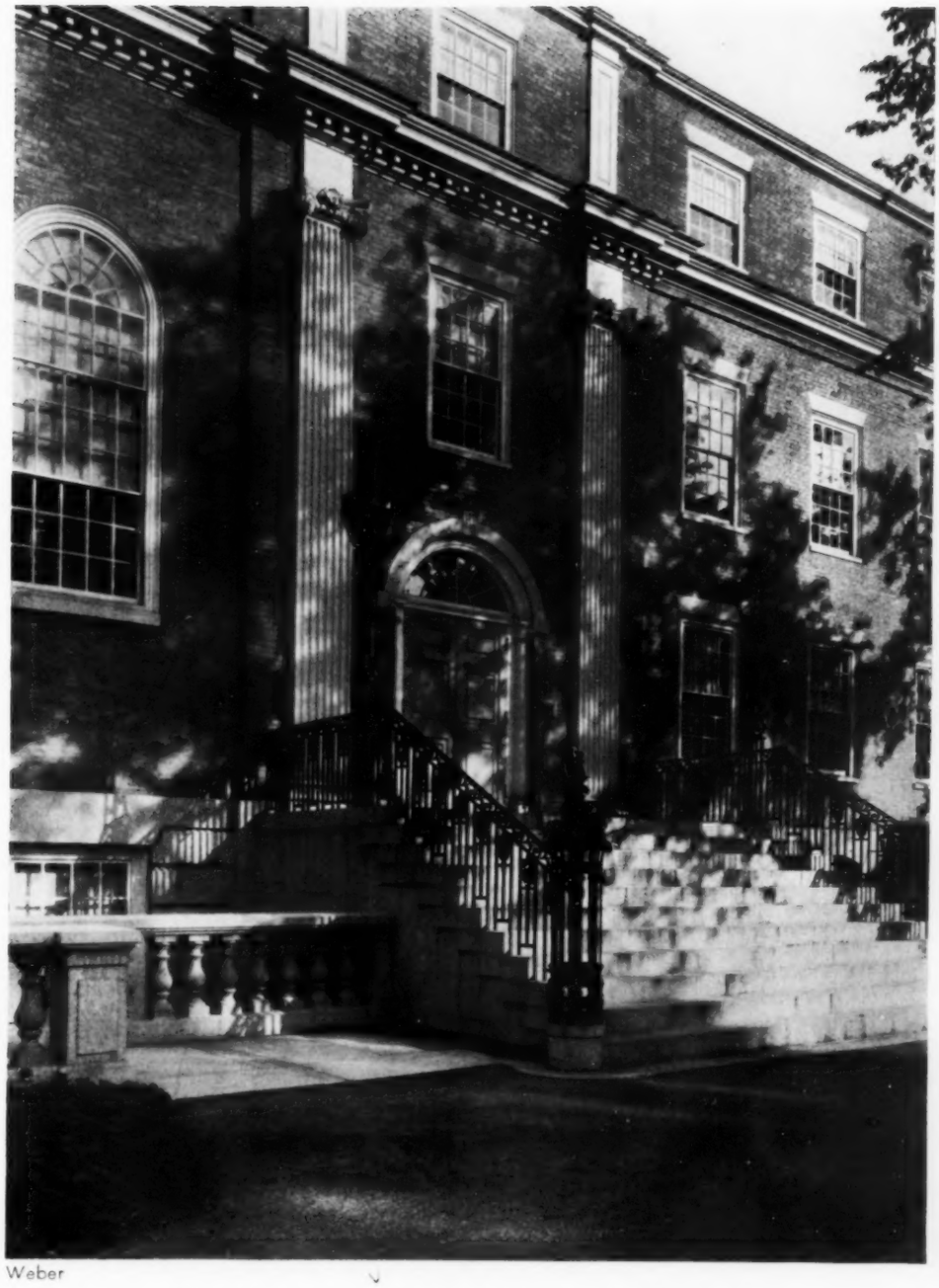
Likewise, the creation and permanent maintenance of the really fundamental community values (not only as to general community character and atmosphere and the prevention of blight or economic deterioration, but with regard to specific physical amenities of outlook, quiet and seclusion from traffic dangers) can only be accomplished through the exercise of a high type of imagination and the full comprehension of what group planning really means.

Nor does this conception of group planning stop with the province of the architect. It is, and should be recognized as, a mutual challenge to the engineer, the investment banker and the sociologist as well. While the opportunity is open to the architect to lead the way in this field, which will become increasingly important as America awakes to the necessity and opportunities for the development of finer communities and better community life, he must always be fully aware of the need to develop his technique in relation to the efforts and contributions of other technicians. Any effective procedure in these matters will depend very greatly upon continuity of effort and the free exchange of professional experience similar to that practiced in the professions of medicine and science.

HENRY WRIGHT and C. S. STEIN, *Architects*,
NEW YORK CITY.

PORTFOLIO
OF CURRENT
ARCHITECTURE

OCTOBER
1931



Weber

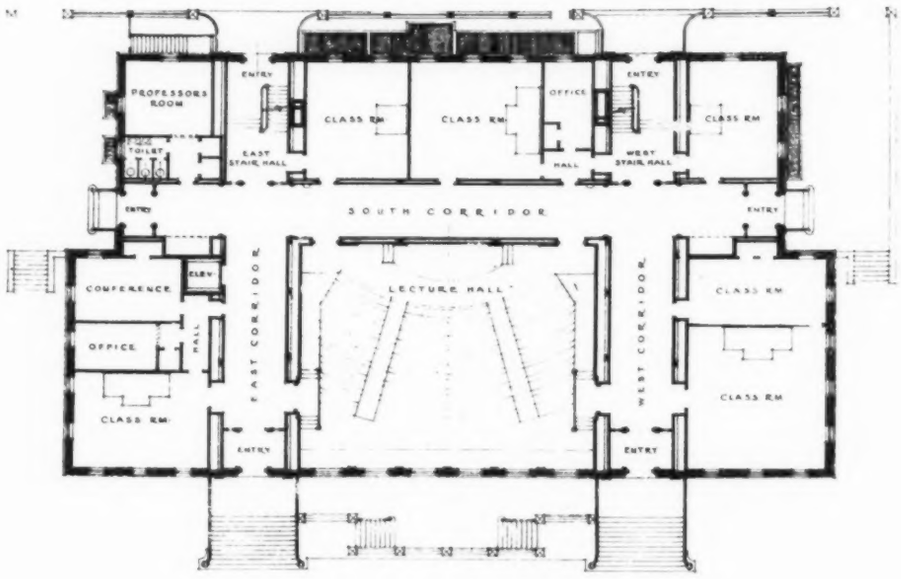
RADCLIFFE COLLEGE LECTURE HALL, CAMBRIDGE, MASS.
PERRY, SHAW AND HEPBURN, ARCHITECTS

OTHER BUILDINGS ILLUSTRATED IN THIS PORTFOLIO:

APARTMENT HOUSE AND JUNIOR LEAGUE CLUB ROOMS, BOSTON—Strickland, Blodgett and Law, Architects.

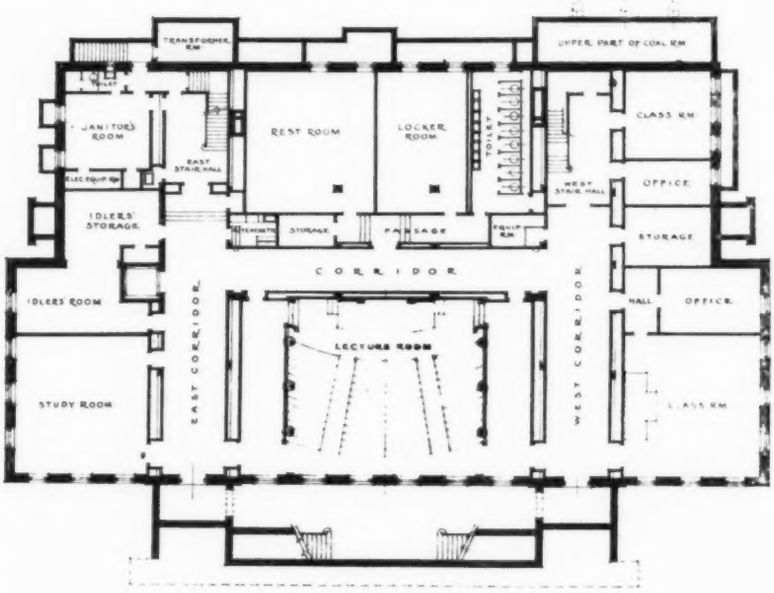
COURT OF DIANA, MICHIGAN SQUARE BUILDING, CHICAGO—Holabird and Root, Architects.

ELEVATOR LOBBY and OFFICE INTERIORS, OTIS ELEVATOR CO. BUILDING, CHICAGO —Holabird and Root, Architects.



FIRST FLOOR PLAN

SCALE



BASEMENT PLAN

SCALE

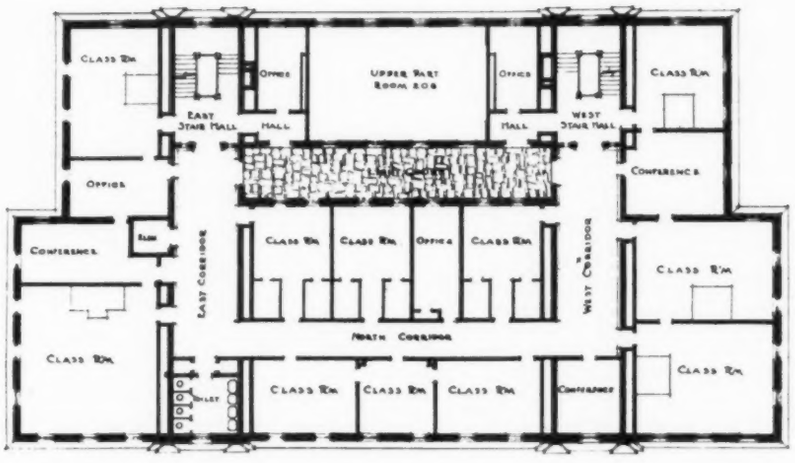
RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

The Mary Alice Longfellow Hall occupies a plot approximately 120 by 190 feet on the south side of the campus.

Weber

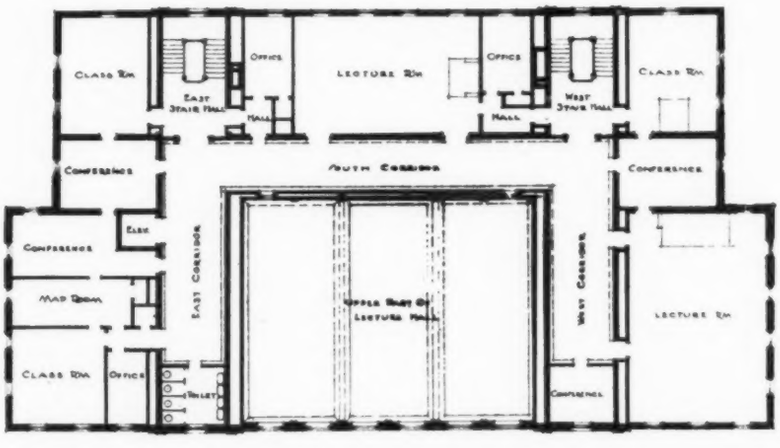
The hall follows the design of other buildings in the college group. Total cost, $618,619, or about 75c a cubic foot.

RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS



THIRD FLOOR PLAN

SCALE

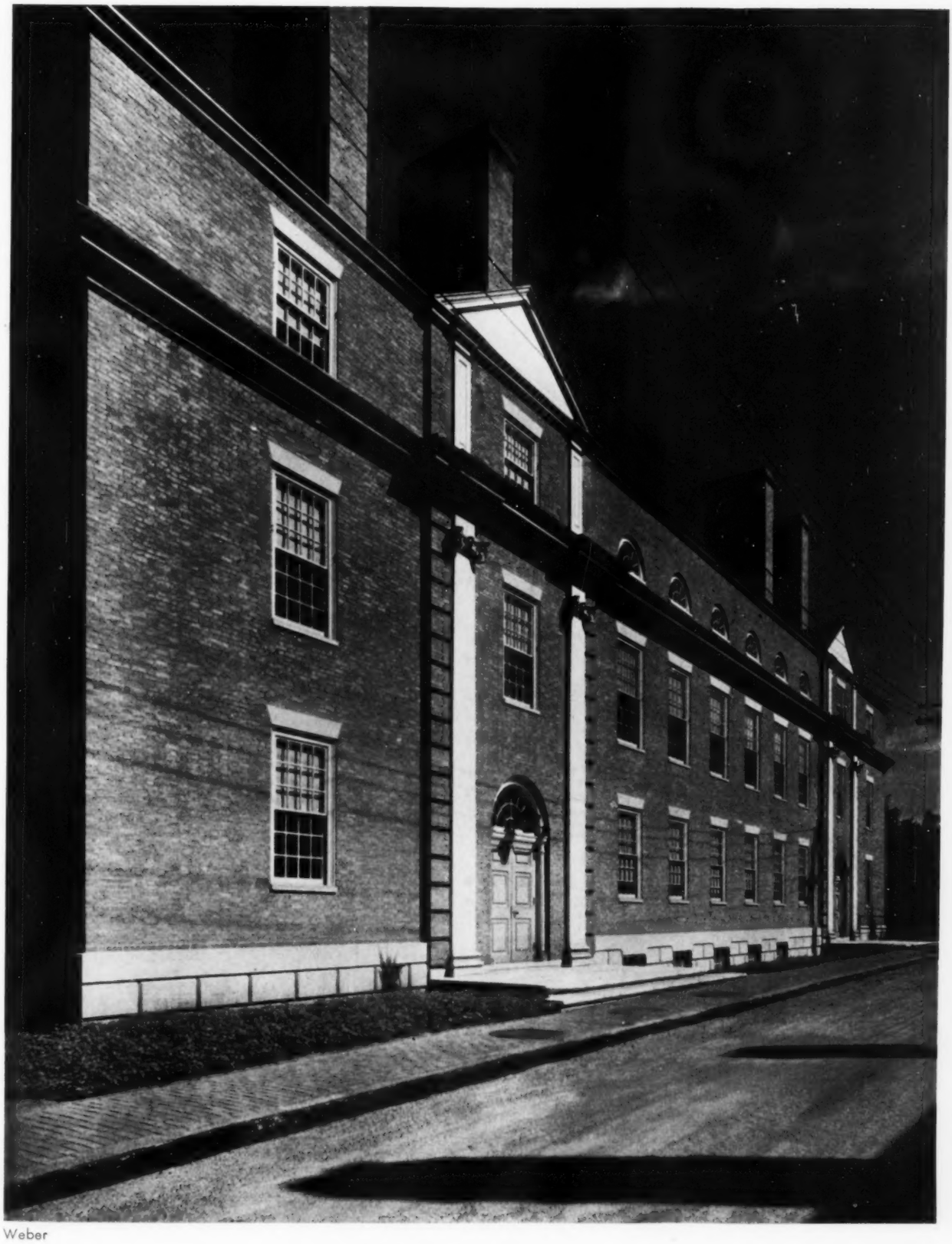


SECOND FLOOR PLAN

SCALE

RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

Plans provide 4 large lecture rooms, 23 classrooms with offices and conference rooms, rest rooms, study rooms and professors' rooms.



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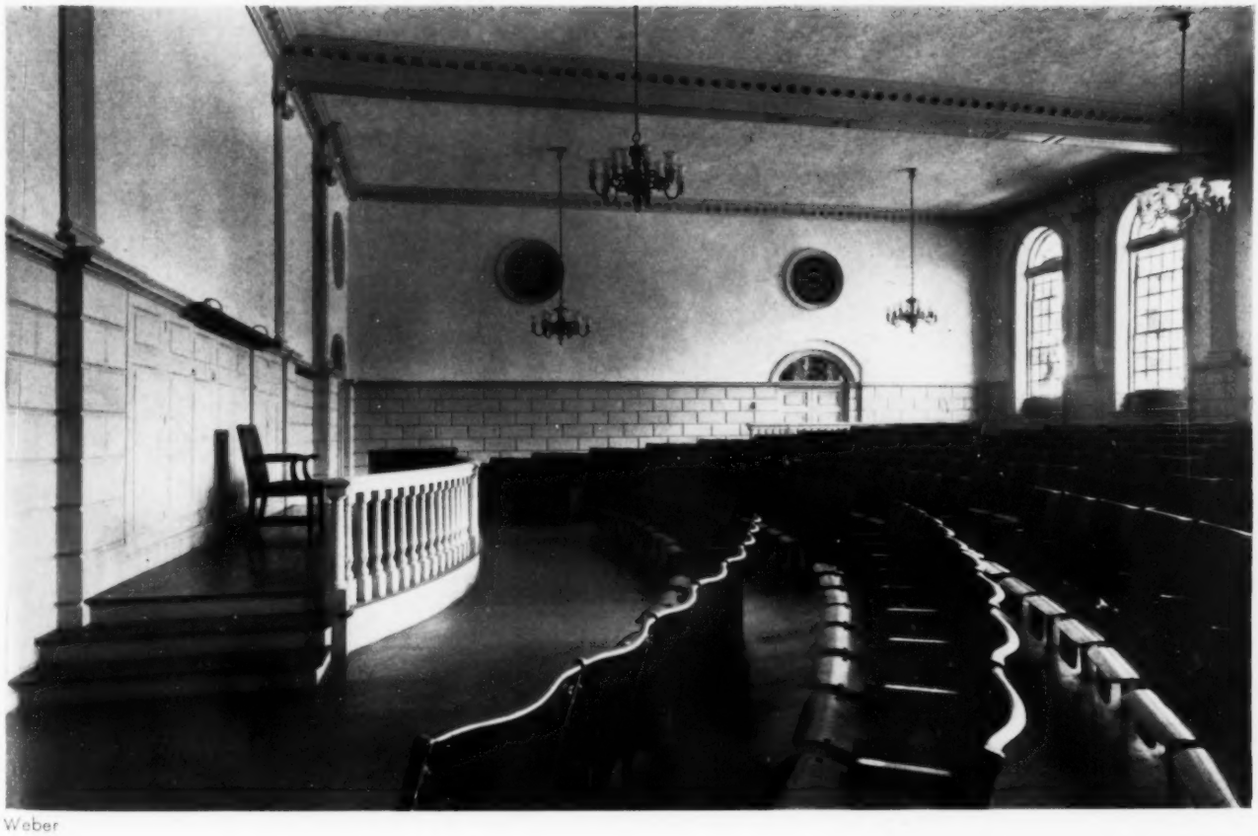
Base course is cut granite, with brickwork above. Cornices are wood. Applied pilasters flank the entrance motifs.

RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

Weber

RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

A special salmon brick, now called the Radcliffe brick, was selected to match the brickwork in the other college buildings.



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Above, general view of building. Below, first floor lecture room.

RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

Weber

RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

Second floor lecture room. Interior wood finish of special detail. Painted plaster walls.

Weber

Basement lecture room. Where necessary in the building, acoustic plaster has been applied to ceilings.

RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

Weber

RADCLIFFE COLLEGE LECTURE HALL
CAMBRIDGE, MASSACHUSETTS
PERRY, SHAW AND HEPBURN, ARCHITECTS

Natural grades permit a basement level only slightly lower than campus, thus giving outside windows to basement lecture rooms.

Weber

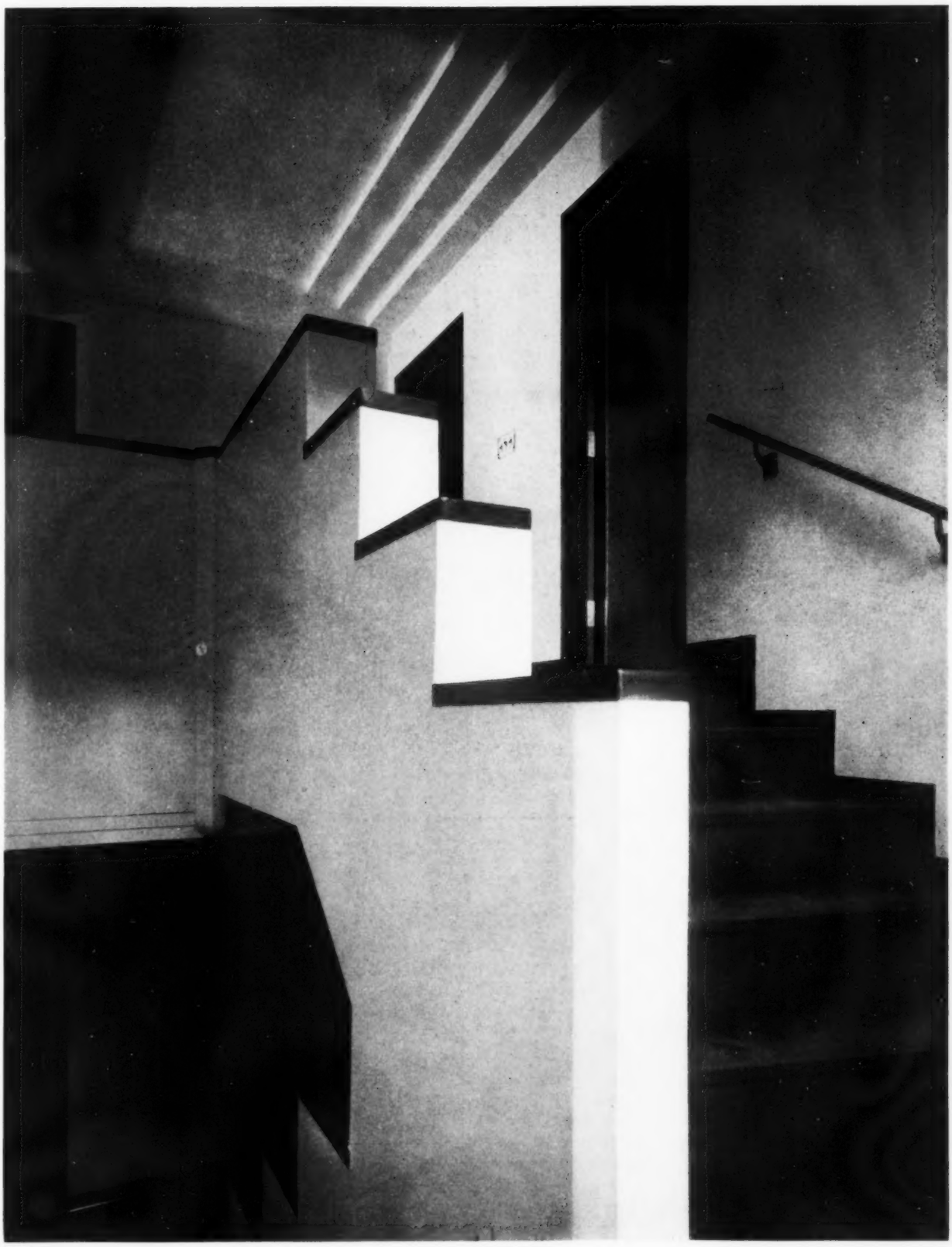
Lower two floors are of black Wisconsin polished granite trim. Upper stories are of dull salmon Holland brick with black and buff artificial stone trim.

APARTMENT HOUSE AND JUNIOR LEAGUE
6 ARLINGTON STREET, BOSTON
STRICKLAND, BLODGET AND LAW, ARCHITECTS

Weber

Above, the main lounge. Below, the main floor. The building is of steel frame and reinforced concrete construction.

APARTMENT HOUSE AND JUNIOR LEAGUE
6 ARLINGTON STREET, BOSTON
STRICKLAND, BLODGET AND LAW, ARCHITECTS



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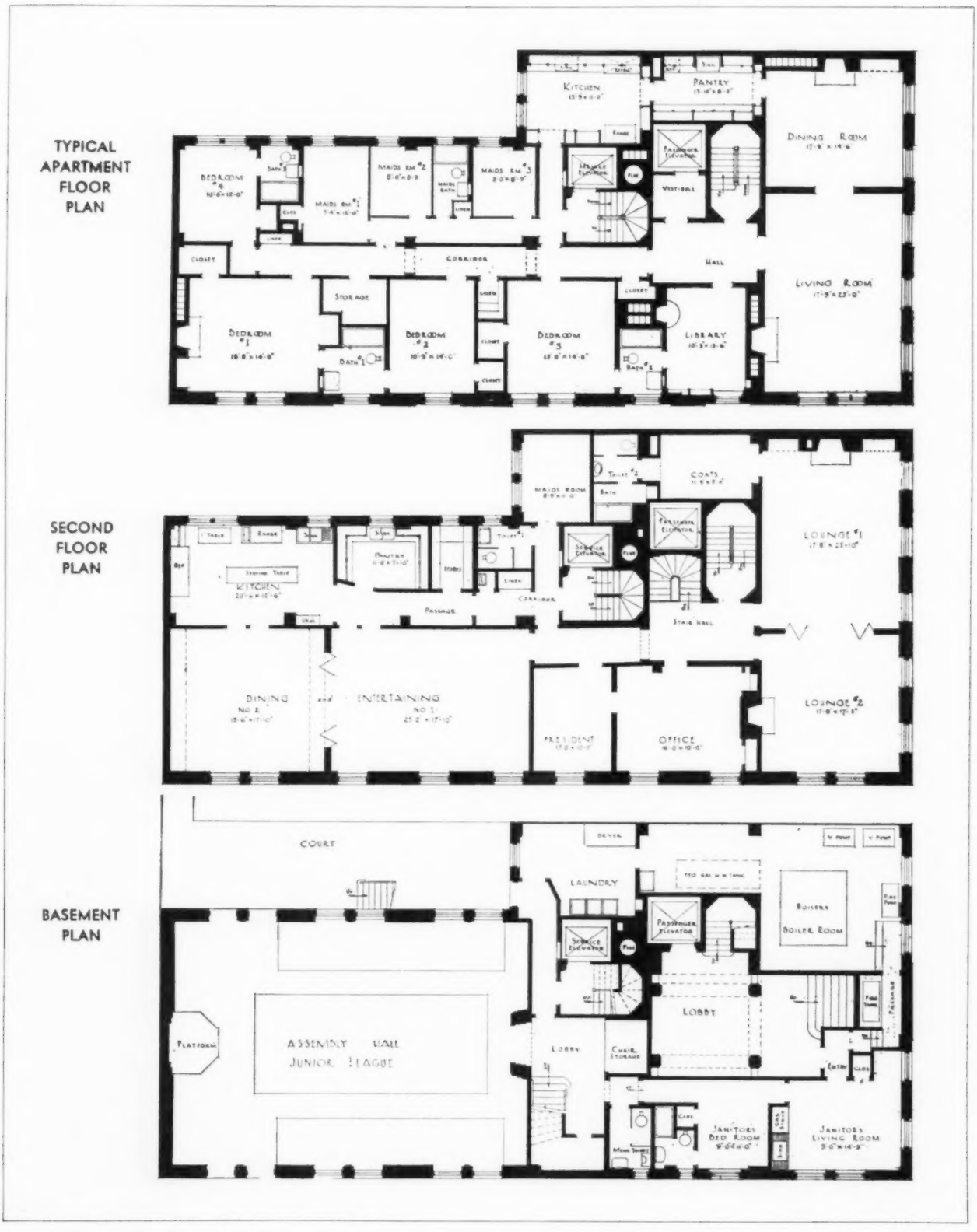
Stairway in entrance lobby. Total cost of building, including all special finish, about $440,000.

APARTMENT HOUSE AND JUNIOR LEAGUE
6 ARLINGTON STREET, BOSTON
STRICKLAND, BLODGET AND LAW, ARCHITECTS



APARTMENT HOUSE AND JUNIOR LEAGUE
6 ARLINGTON STREET, BOSTON
STRICKLAND, BLODGET AND LAW, ARCHITECTS

Lower two floors and half the basement are the Junior League quarters, reached by a separate entrance. The upper eight stories are cooperative apartments.

Weber

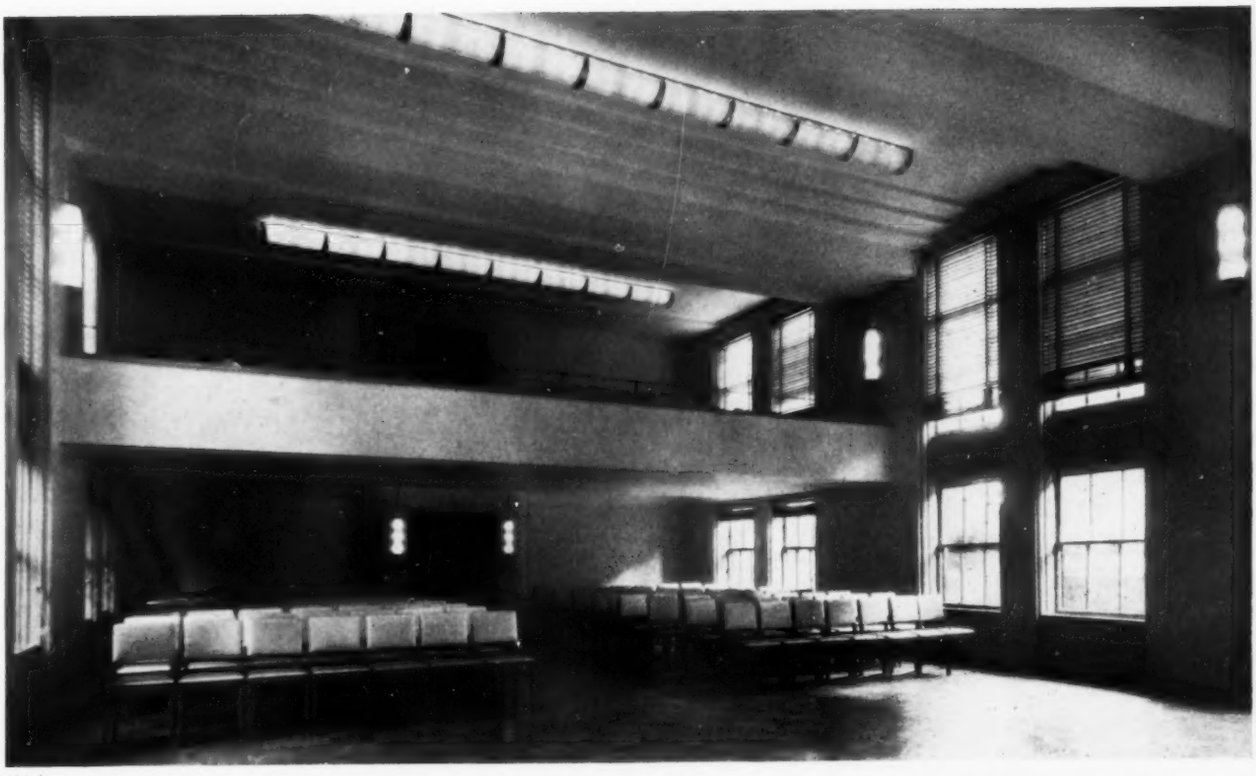
Corridor on first floor.

APARTMENT HOUSE AND JUNIOR LEAGUE
6 ARLINGTON STREET, BOSTON
STRICKLAND, BLODGET AND LAW, ARCHITECTS

Weber

APARTMENT HOUSE AND JUNIOR LEAGUE
6 ARLINGTON STREET, BOSTON
STRICKLAND, BLODGET AND LAW, ARCHITECTS

Assembly room. Over this room are very large girders taking the loads of columns coming down from the apartment floors above.



Weber

Weber

Above, the Junior League assembly room. Below, the dining rooms.

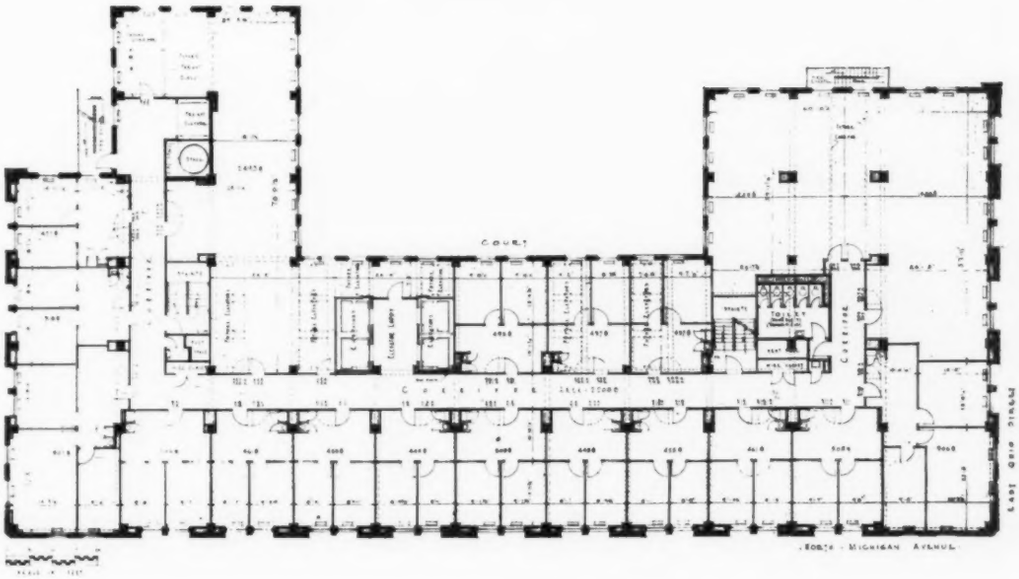
APARTMENT HOUSE AND JUNIOR LEAGUE
6 ARLINGTON STREET, BOSTON
STRICKLAND, BLODGET AND LAW, ARCHITECTS

Weber

Dressing room on first floor.

APARTMENT HOUSE AND JUNIOR LEAGUE
6 ARLINGTON STREET, BOSTON
STRICKLAND, BLODGET AND LAW, ARCHITECTS

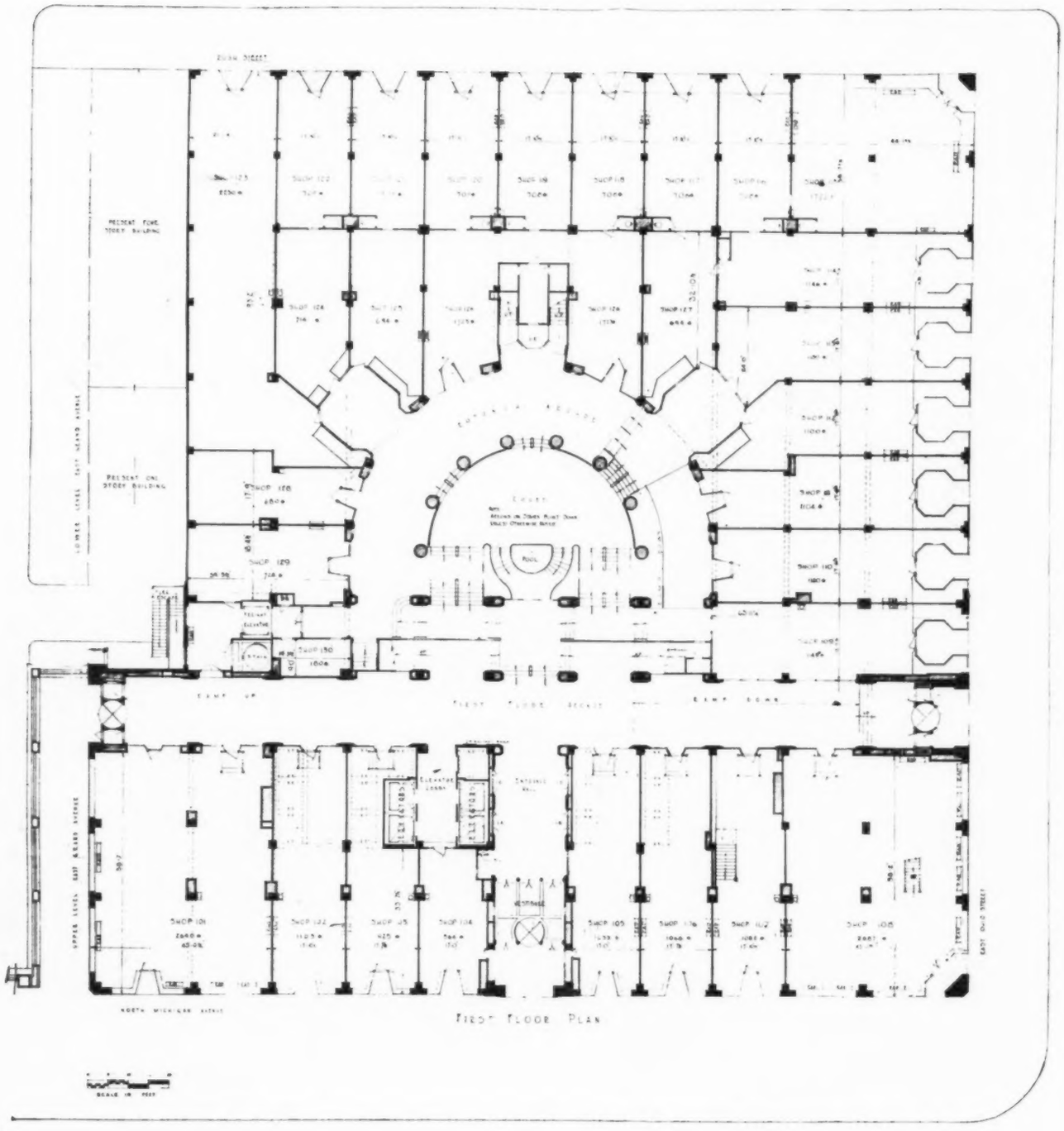
Hedrich-Blessing



PLAN OF
TYPICAL FLOOR

Small individual shops predominate in this district. The building has a black granite base. All walls are faced with buff Bedford limestone. Approximate cost, 78c a cubic foot.

MICHIGAN SQUARE BUILDING
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS



FIRST FLOOR PLAN

MICHIGAN SQUARE BUILDING
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS

In almost all instances the ground floor shops have frontages on both the street and the interior court and arcades.

Shigeta-Wright

The shops are grouped on various levels around the rotunda. The Diana Fountain is by Carl Milles, sculptor. Several assembly rooms on the mezzanine level are popular for informal gatherings.

MICHIGAN SQUARE BUILDING
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS

Hedrich-Blessing

MICHIGAN SQUARE BUILDING
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS

The Court of Diana. The large glazed ceiling is indirectly illuminated. Around the upper walls are illuminated carved glass panels by Edgar Miller.

Hedrich-Blessing

Stairway in the Court of Diana. The columns in the court are of art marble in buff and brown; the floors of terrazzo in chocolate, buff and yellow. The stairs are of art marble in light buff.

MICHIGAN SQUARE BUILDING
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS

Shigeta-Wright

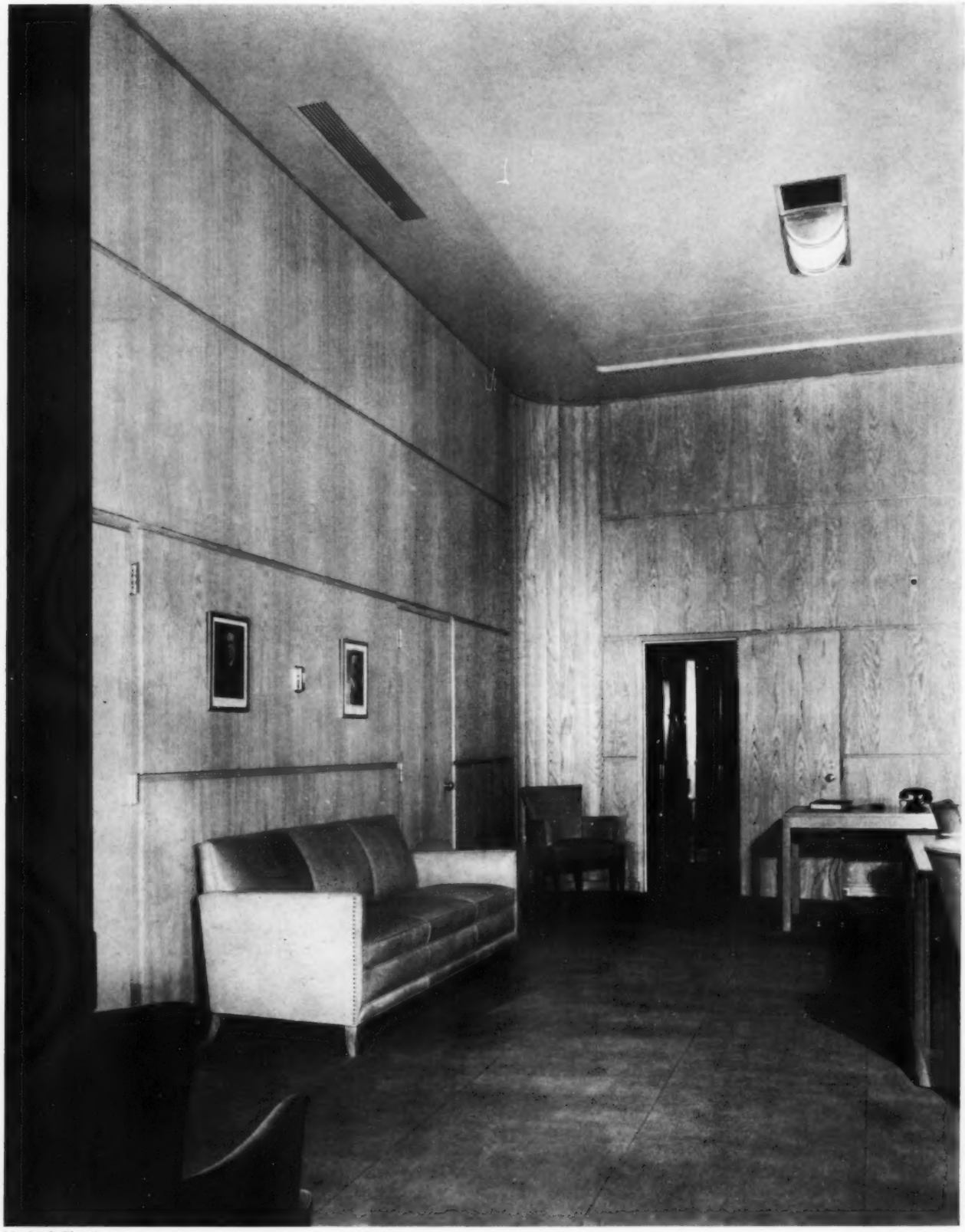
MICHIGAN SQUARE BUILDING
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS

Stairway detail. The balustrades are of cast iron, the handrails of nickel.

Hedrich-Blessing

The public lobby is lined with marble. Elevator doors and mailbox are cast bronze. The floor is terrazzo in chocolate and light buff.

OTIS ELEVATOR COMPANY OFFICES
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS



Hedrich-Blessing

OTIS ELEVATOR COMPANY OFFICES
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS

President's office. This room adjoins an office lobby from which marble stairs lead down to the public lobby.

Hedrich-Blessing

President's office. The walls are faced with chestnut. The furniture is of white oak and pigskin.

OTIS ELEVATOR COMPANY OFFICES
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS

Hedrich-Blessing

President's office. The hangings are in tans and browns.

OTIS ELEVATOR COMPANY OFFICES
CHICAGO, ILLINOIS
HOLABIRD AND ROOT, ARCHITECTS

A FIFTH AVENUE OFFICE BUILDING

By Dakin Bennett Ferris

Nyholm and Lincoln

SHREVE, LAMB AND HARMON, ARCHITECTS

The skyscraper office building at 500 Fifth Avenue, the northwest corner of Fifth Avenue and Forty-second Street, New York City, is designed to provide a maximum of shop frontage and well-lighted office space.

Elevators, stairs and toilets are located along the north wall of the building, occupying the portion of the perimeter where light is least under control and where the position of utilities subtracts least from the office floor rentable space. The owners, however, control the property immediately to the north which insures light on that side for some time. On the west, starting at the sixth floor level, a light court 25 feet wide, the full width of the property, is provided.

Facing Forty-second Street, the New York Public Library and Bryant Park, the property has an unobstructed southern outlook of two square blocks. The spacing of window openings takes full advantage of this exposure. On the eastern side the building faces Fifth Avenue.

The Fifth Avenue wall rises thirteen stories to its first setback, while at the west end of the Forty-second Street façade the first setback is at the twenty-first floor owing to more favorable zoning conditions. From these setback levels there are a series of receding surfaces terminating at the thirty-sixth floor; from here, for an additional twenty-two stories, rise the tower and penthouse, 699 feet above Fifth Avenue.

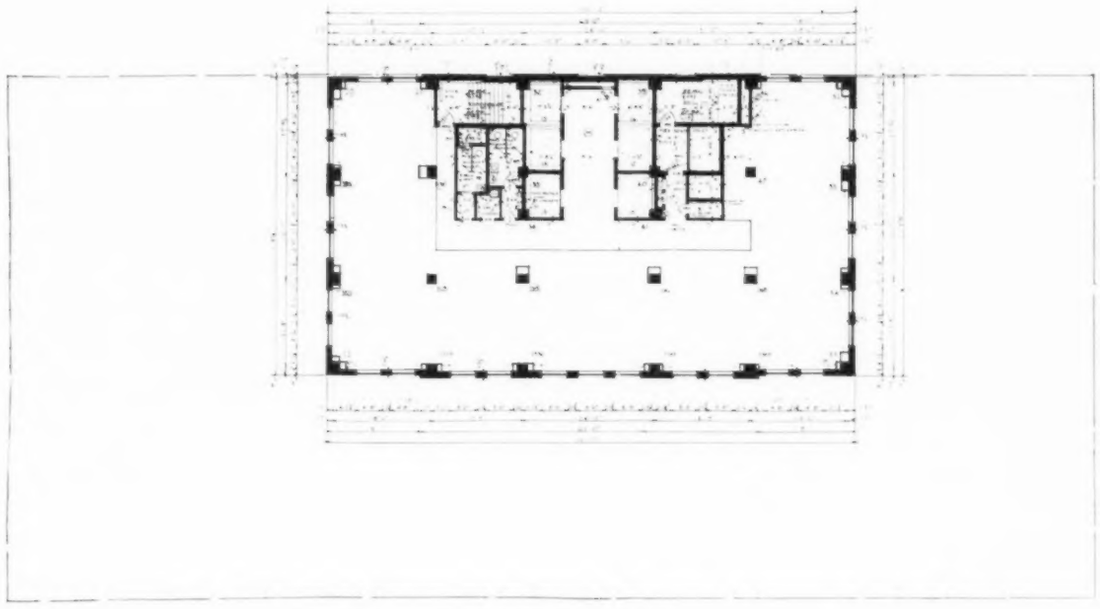
With the great amount of window area unusual flexibility in exterior arrangement is possible. Units as small as 9 feet wide and as large as an entire floor can be leased. The exterior walls for the second, third and fourth floors are of limestone with an unbroken line of show windows at the street floor level. Above, the piers are of light-colored brick; the spandrels generally are also of brick. Certain groups of windows as well as the upper 30 feet of the tower are accentuated by the introduction of ornamented architectural terra cotta.

The main entrance to the building is on the Fifth Avenue side, 70 feet from Forty-second Street. The opening is 11 feet wide by 20 feet high with two flanking pylons. Over the great doorway a carved keystone is placed. This portal leads into an open entrance lobby with a travertine floor, carved limestone walls and a decorative vaulted ceiling. At the inner end is a large bronze grille beneath which are the doorways to the building. These lead to the entrance vestibule, the main elevator corridor, the elevator lobbies upon which open the low, intermediate and high rise groups of six elevators each, and two open ornamental stairways giving direct access to the front and rear parts of the second floor.

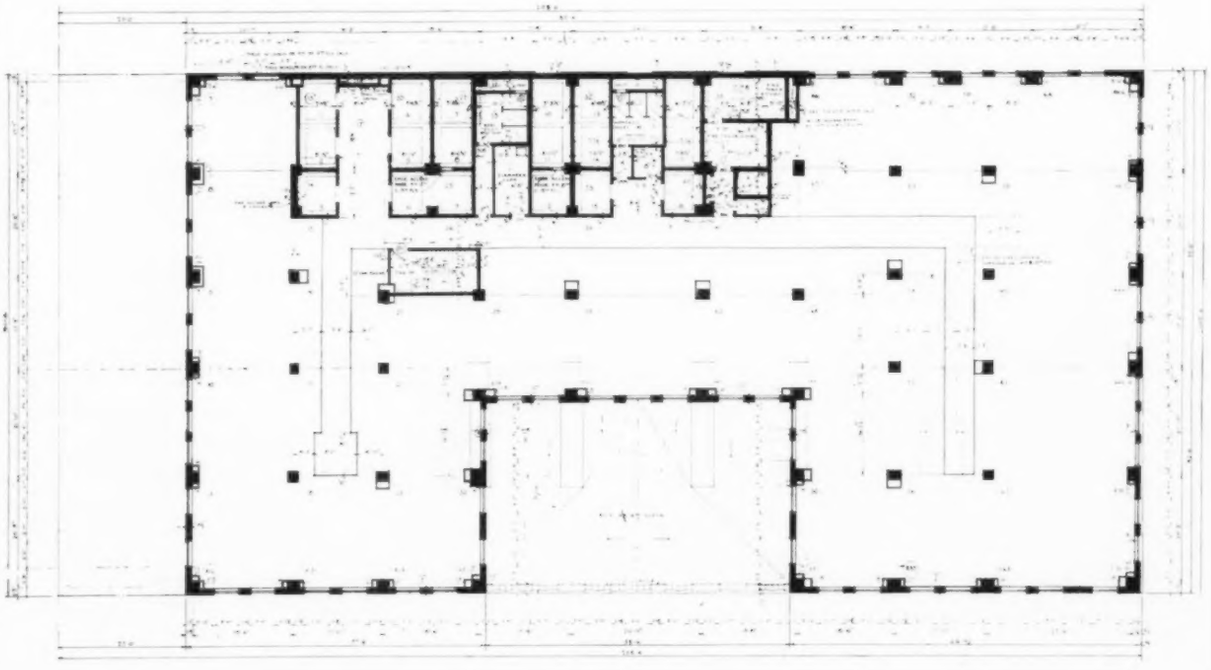
The eighteen full automatic signal control elevators serve a total of 520,000 square feet of rentable area. The walls of the first floor elevator lobbies, the main elevator corridor and the entrance vestibule are treated with Belgian black base, golden veined Formosa and dark Formosa marble. The elevator fronts, elevator control panels, information desk and grilles are of ornamental cast bronze. The ceilings are modeled plaster with recessed panels to receive concealed lighting. All plaster surfaces are finished with aluminum leaf and lacquer.

The walls of the typical floor elevator corridors have a Florida cream marble wainscot and Belgian black marble base; the elevator door openings are also trimmed with Belgian black marble. The floors are of terrazzo with brass strips; the ceilings are of paneled plaster. The lobbies open on floor areas varying from 2,150 to 18,000 square feet. Except for floors below the ninth, there is no space more than 30 feet from outside light.

To achieve this income-producing building, a group consisting of the architect, the owner, his real estate advisers and his operating manager, and the builder, was organized. This group functioned as a building committee throughout the construction of the building.



TOWER FLOOR PLAN



TYPICAL FLOOR PLAN

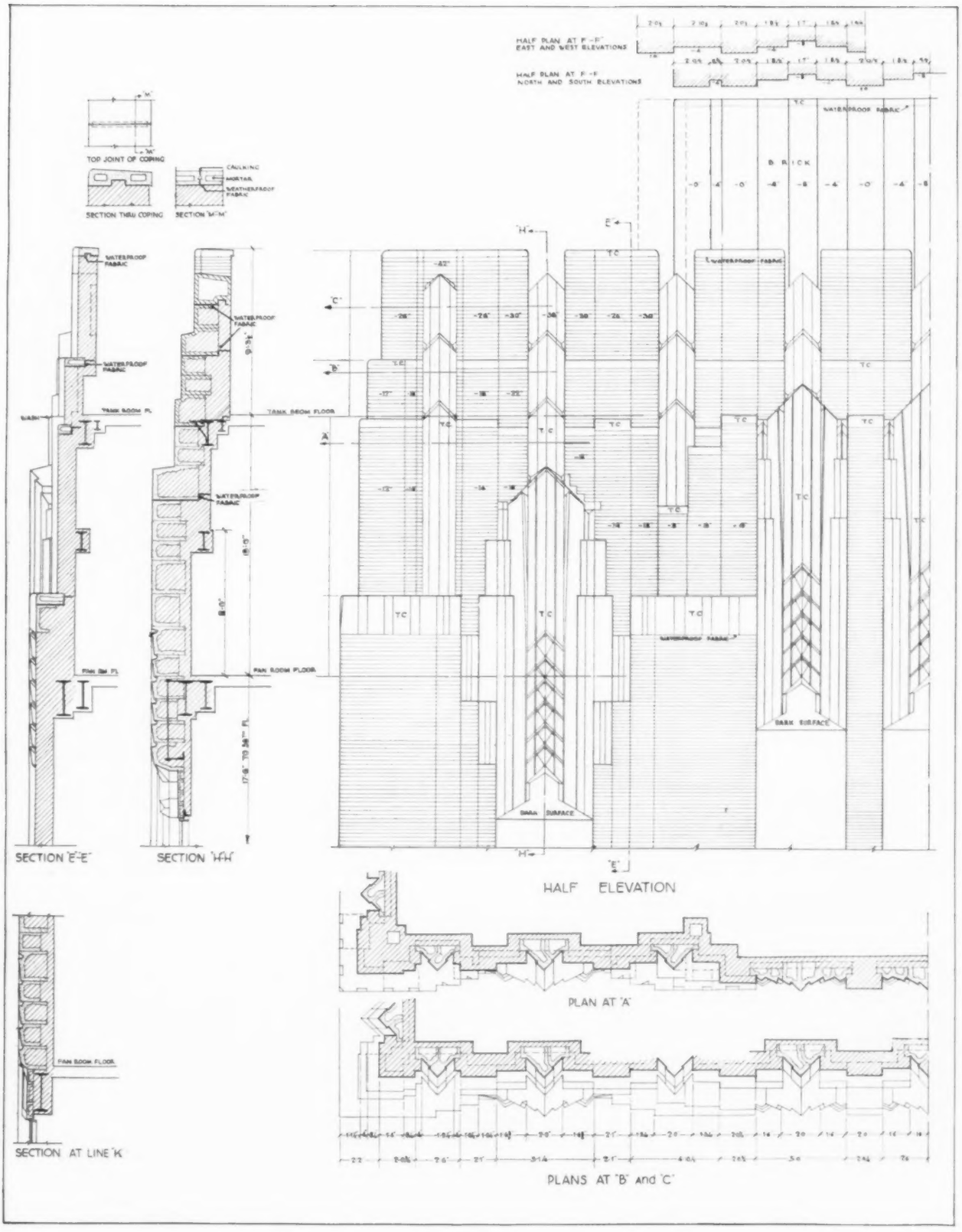
500 FIFTH AVENUE OFFICE TOWER
NEW YORK CITY
SHREVE, LAMB & HARMON, ARCHITECTS

Elevators, stairs and toilets are placed along the north wall in order to subtract least from the rentable floor space.

Nyholm and Lincoln

View of skyscraper from Fortieth Street and Fifth Avenue.

500 FIFTH AVENUE OFFICE TOWER
NEW YORK CITY
SHREVE, LAMB & HARMON, ARCHITECTS



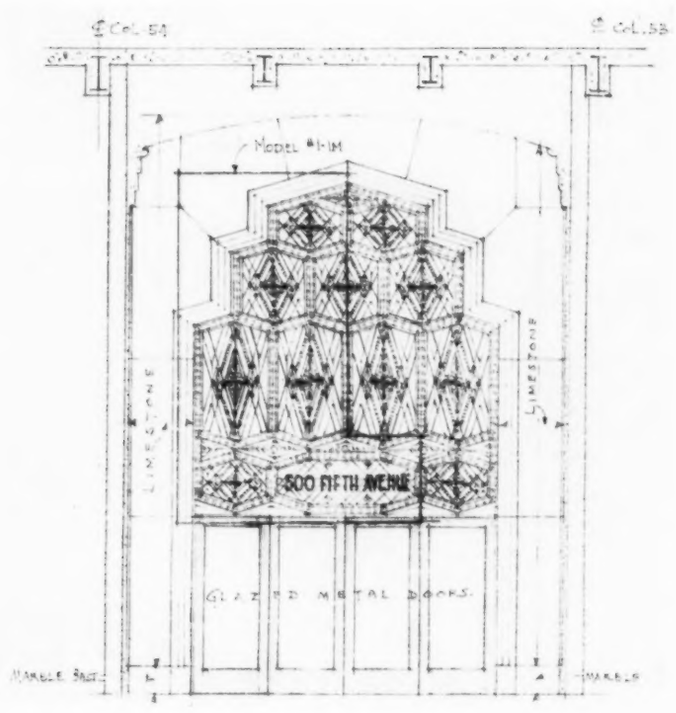
500 FIFTH AVENUE OFFICE TOWER
NEW YORK CITY
SHREVE, LAMB & HARMON, ARCHITECTS

Construction details of tower. The tower and penthouse are 699 feet above Fifth Avenue.

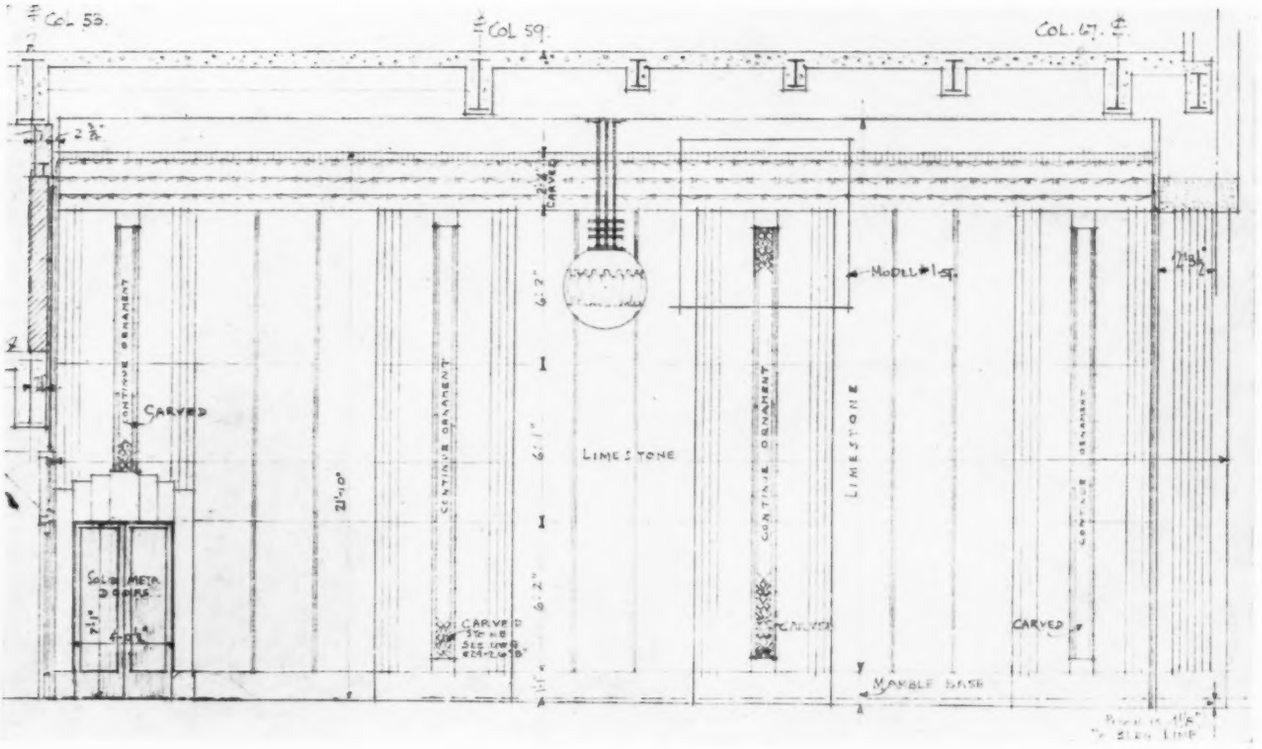
Nyholm and Lincoln

North side of building as viewed from Fifth Avenue.

500 FIFTH AVENUE OFFICE TOWER
NEW YORK CITY
SHREVE, LAMB & HARMON, ARCHITECTS



Construction details of entrance lobby.



500 FIFTH AVENUE OFFICE TOWER
NEW YORK CITY
SHREVE, LAMB & HARMON, ARCHITECTS

Nyholm & Lincoln

The open entrance lobby has a travertine floor, carved limestone walls and a vaulted ceiling. The doors are bronze.

500 FIFTH AVENUE OFFICE TOWER
NEW YORK CITY
SHREVE, LAMB & HARMON, ARCHITECTS

500 FIFTH AVENUE OFFICE TOWER
NEW YORK CITY
SHREVE, LAMB & HARMON, ARCHITECTS

Elevator lobby. The walls are marble; the ceiling is modeled plaster, finished with aluminum leaf and lacquer. Recessed panels provide indirect illumination.

COLOR STUDIES IN REMODELING

WILLIAM MUSCHENHEIM
ARCHITECT

Byron Co.

REMODELED HOUSE AT HAMPTON BAYS, L. I.

The frontispiece of this issue shows the color scheme of a typical bedroom, and the second floor plan.

The house at Hampton Bays is a summer cottage, and in remodeling, this function was kept in mind. More space, more baths and much airier rooms were needed; the new design provides these.

The lower floor has been planned as a large open area where the members of the family and their guests may come and go. Upstairs, the old rooms with their small windows and projecting eaves have been turned into dressing rooms, and doors lead to the new bedrooms through what were formerly windows. Two sides of each bedroom are practically of glass.

Interior Color Scheme

Very strong colors have been used throughout the entire house. Certain walls have been accentuated where it was considered desirable to get a feeling of depth or the contrary, to make the most of a sunny exposure, or to harmonize the coloring of the room with the view outside. The colors are sometimes in blue, sometimes in red or yellow, and usually shade in with white or gray. Warm colors are used for sunny rooms; the cool colors for rooms facing the water and without much light.

Very few rooms have more than one or two colors, but the colors connect from one room to the next. Since each room has a different exposure peculiar to itself, no two rooms have been treated exactly alike.

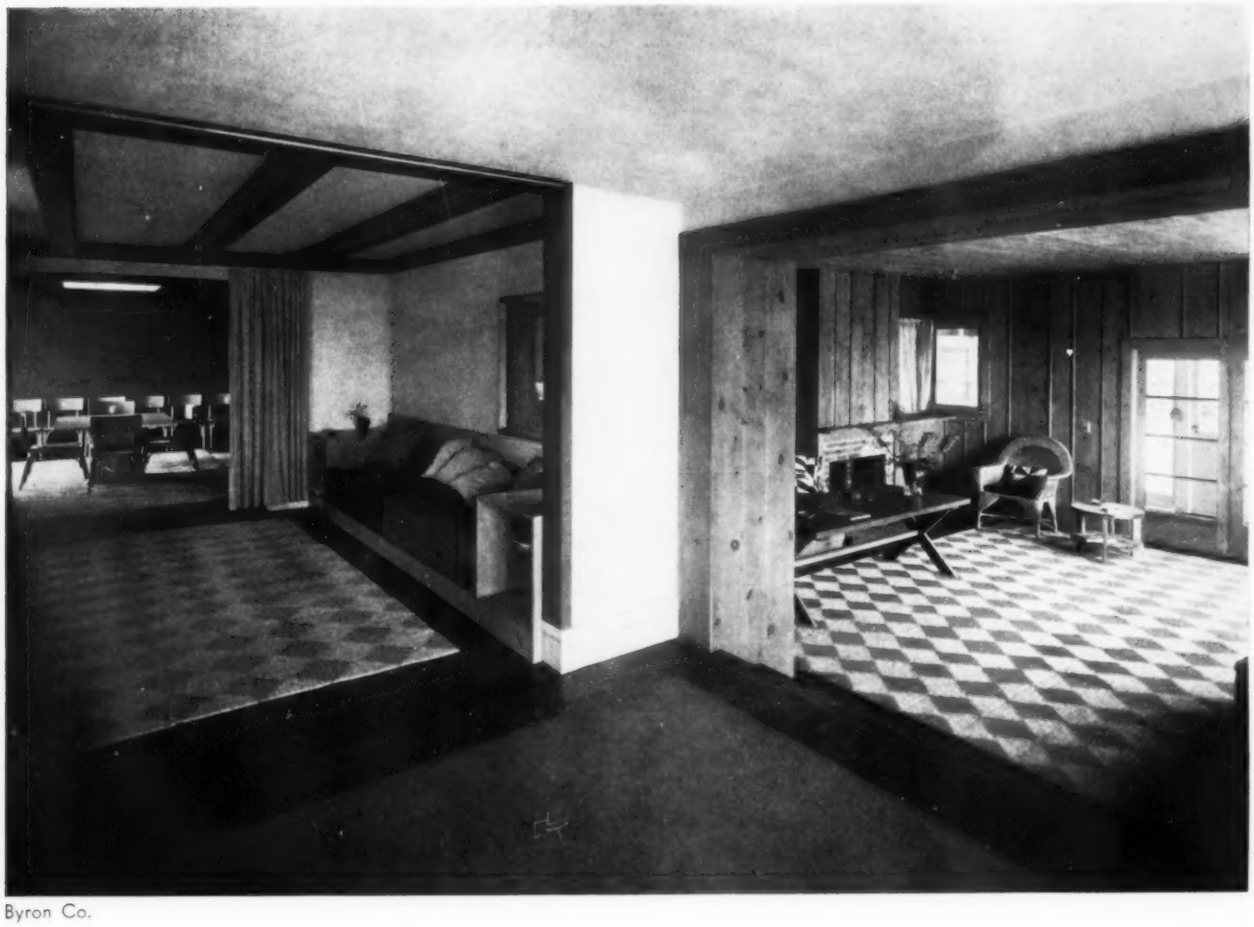
Rules of Color Selection

Two fundamental rules—one of contrast and one of harmony—have been observed. Red, yellow and blue were selected as the contrasting colors; blue and green, yellow and orange, red and purple as the harmonious colors.

Following the rules of contrast and harmony, it was chiefly a matter of playing one color against the next until the desired effect was achieved. The linen floor rugs are not always dark blue, as shown in the color frontispiece of this issue, but always in keeping with the general color scheme of the individual room.

Exterior Color Scheme

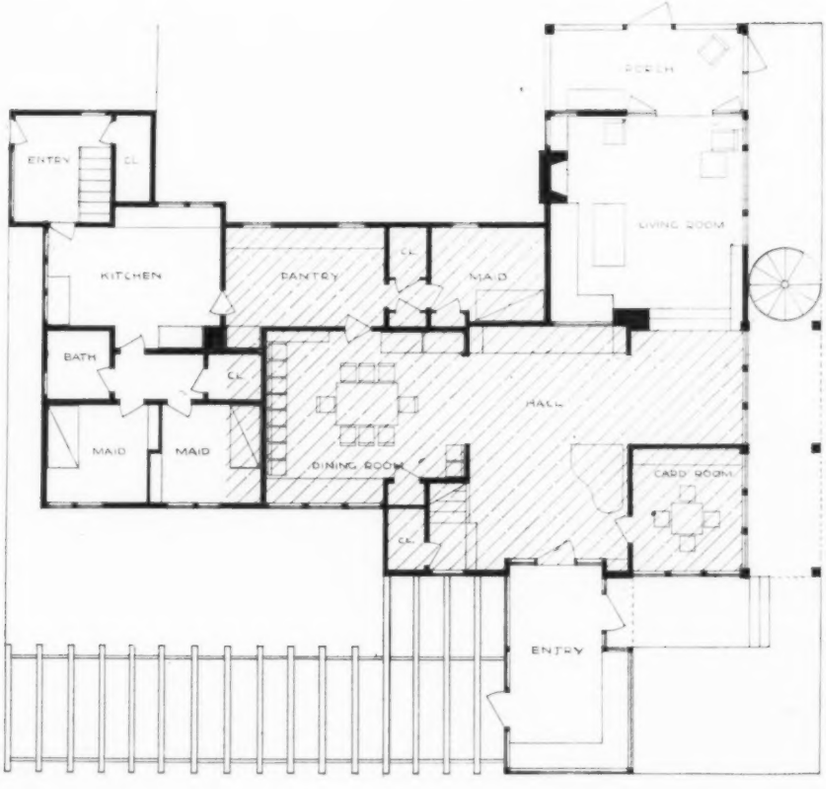
On the exterior, the old house and the new parts are distinctly separated by the color treatment. The old house has gray shingles with yellow window trim. The new wings are of clapboards painted white, with dark blue window trim. The entrance doors are black or vermilion. The wooden rails on the terraces are yellow.



Byron Co.

Above—Hall and Living Room

Right—Ground Floor Plan



HOUSE OF FRED MUSCHENHEIM
HAMPTON BAYS, LONG ISLAND
WILLIAM MUSCHENHEIM, ARCHITECT

Byron Co.

Above—Hall and Dining Room

Left—Southeast Bedroom

HOUSE OF FRED MUSCHENHEIM
HAMPTON BAYS, LONG ISLAND
WILLIAM MUSCHENHEIM, ARCHITECT

JOHN GALEN HOWARD
1864–1931

Distinction marked the works as it did the presence of John Galen Howard. Fame came early to him in his professional practice.

His architectural studies covered six years—the first three at Massachusetts Institute of Technology, and the last three, after an interval, at the Ecole des Beaux Arts in Paris. His own practice in New York and Boston began in 1893. He was appointed supervising architect, University of California, in 1901 and, in less than a year, thereafter, moved permanently to Berkeley, where his contribution of monumental structures to the University of California Campus is well known.

Mr. Howard organized two architectural firms in San Francisco: Howard and Galloway (1906-08) and John Galen Howard and Associates (1923-27). He was a leading member of the Board of Architects of the Pan-American Exposition at Buffalo, 1901, and by unanimous election of his fellows designed the Electric Tower. His fame brought to the firm of Howard and Galloway the commission as architects-in-chief for the Alaska-Yukon-Pacific Exposition in Seattle. He was also a member of the preliminary commission for the Panama-Pacific International Exposition at San Francisco. He rendered service to San Francisco often, as for example, on the Advisory Committee of Architects for rebuilding after the earthquake and fire of 1906, on the Board of Architects for the development of the Civic Center and the construction of the Municipal Auditorium, and on the Architectural Advisory Commission for the War Memorial.

His part was large in the conception and execution of great projects, public and monumental. His honors and activities in technical organizations were many. Throughout his years of practice, he was interested in the aspiring young architect. This feeling naturally expressed itself in active teaching.

Soon after his arrival in Berkeley he launched "The Ark" (the affectionately familiar name of the School of Architecture, University of California), where his first class enrolled in August, 1903, and where, except for occasional trips abroad, he continued for twenty-eight years.

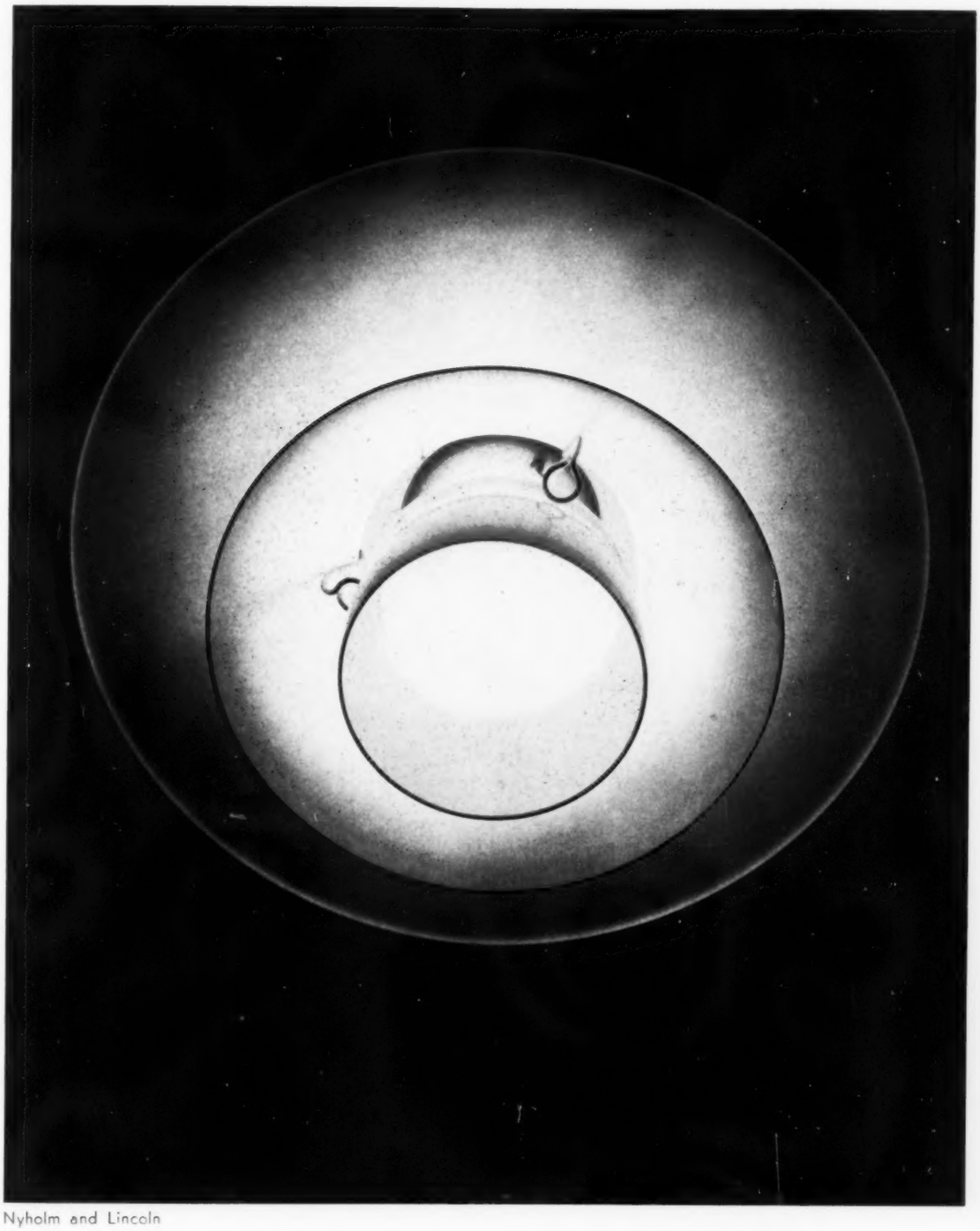
His days were devoted to that rare kind of teaching which comes only from one who, after good training, has had many years of experience in practice and in life itself. He had true human qualities, for "he worked joyously." His last years of teaching were by far his most fruitful and best.

WILLIAM C. HAYS

TECHNICAL NEWS AND RESEARCH

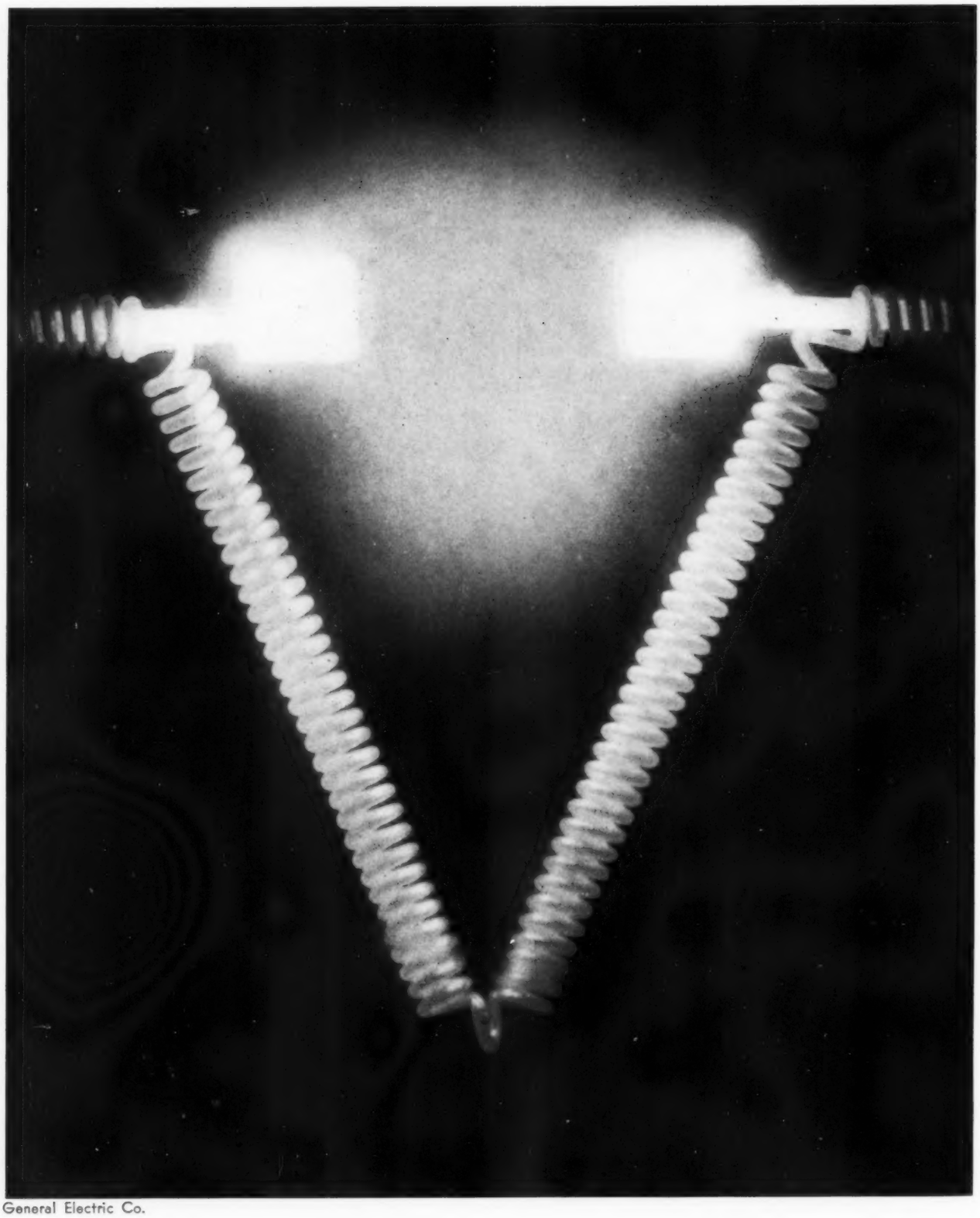
TRENDS IN LIGHTING

By K. LÖNBERG-HOLM and H. L. LOGAN



Nyholm and Lincoln

P. H. Lamp Reflectors. See Pages 296 and 297.



General Electric Co.

Electrodes, Filament, and Electric Arc of Sunlamp Type S-1

GENERATION OF LIGHT

Cost Level

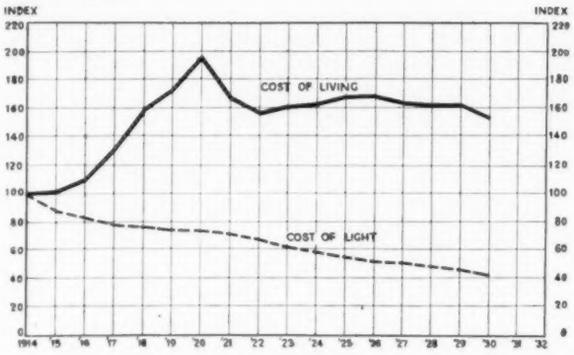


Fig. 1*

Cost of Light

Fig. 1 shows that increased lamp efficiency, decreased lamp price and decreased cost of current have effected a steady downward trend to the curve of cost of light.

Efficiency of Lamps

The larger size tungsten filament lamps are operated close to the melting point of the filament and indications are that temperature radiation illuminants are near the limit of their possible efficiency unless substances with higher melting points and greater selectivity in radiation are found. Table I gives the average lumens, watts and efficiency (lumens per watt) of large lamps sold during the past three years.

	1930	1929	1928
Average lumens	814	797	769
Average watts	61.2	60.7	60.2
Average lumens per watt	13.3	13.1	12.8

Table I*

Average Lumens, Watts and Efficiency of Lamps Sold (Excluding Miniature Lamps)

Sources of Ultra-Violet Radiation

The spectral range of electric light sources has been extended to include the biologically effective short-wave end of the spectrum extending chiefly from A°2800 to A°3100. (Wave lengths are measured in Angström units. One Angström unit —A°—is one ten-millionth of a millimeter.) In order to obtain an appreciable amount of ultra-violet radiation it is necessary to heat the radiating substance to a high temperature, 5,400 degrees F. or higher. Since solids (metals such as tungsten) evaporate very rapidly at high temperatures, sources of ultra-violet radiation are practically confined to electric arcs between electrodes of metals, of carbon and of mercury vapor.

The following are recent developments for general application in homes, workplaces and places of recreation. The S-1, S-2, G-1 and the Mazda CX lamps are all low sources of ultra-violet radiation and are not listed as therapeutic lamps. The biological value and general application of these lamps is discussed on page 297 under LIGHTING FOR HEALTH MAINTENANCE.

*REPORT OF THE LAMP COMMITTEE, JUNE, 1931, National Electric Light Association.

Mazda Sunlight Lamp, Type S-1

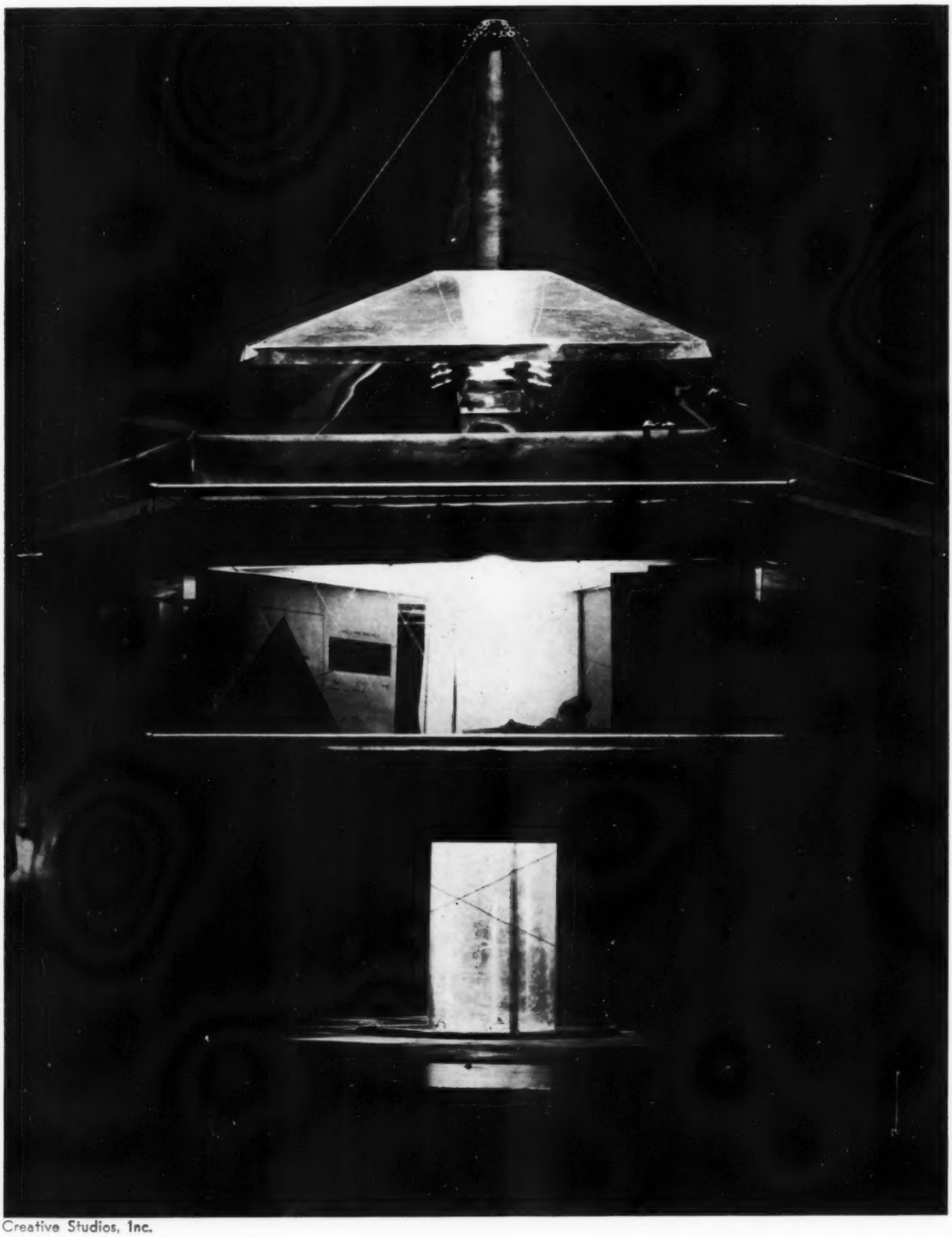
Consists of a V-shaped tungsten filament, two highly incandescent tungsten electrodes and a pool of free mercury enclosed in a bulb of special glass which absorbs the short-wave radiation not present in sunlight and harmful to the eyes, i.e., lower than A°2800. When the current is turned on the filament is heated to incandescence, a portion of the mercury is vaporized and an arc is formed between the electrodes. (See illustration on opposite page). The result of this combination of incandescent solid and arc-vapor radiation is an emission spectrum consisting of a series of strong ultra-violet emission lines of mercury vapor (from A°2800 to A°4050) superposed on a continuous spectrum radiation from the incandescent solid extending throughout the visible and into the deep infra-red.

Measurements by the Bureau of Standards* showed that at a distance of 3 feet, the lamp examined (on 115 volts) had a total intensity, without the wire mesh cover, of about 6.350 micro-watts per square centimeter, or about one-tenth to one-twelfth average solar radiation. Of the total amount measured, about 1.5 per cent consisted of radiation of wave lengths less than A°3130, accepted by biologists as having a special healing value. No data were obtained on the effect of aging of the lamp.

As it is not practicable indoors to utilize intensities of illumination from an artificial source comparable with those of midsummer sunlight outdoors—7000 to 9500 foot-candles—relatively more energy in the ultra-violet region has been provided than is present in the solar spectrum. At the present time the filament supplies approximately 7 per cent of the total light output (as measured visually with a photometer), the arc about 25 per cent and the electrodes the remaining 68 per cent.

The operating characteristics of the Type S-1 lamp require a special transformer to provide one voltage for starting and another for operating. The lamp operates on alternating current. Due to the high base and bulb temperature special provision must be made for ventilation around base and socket of the lamp. The lamp will only operate at full efficiency vertically, base up, but satisfactorily in a range from 0 to 60 degrees. If burned in a horizontal position vaporization is cut down and the ultra-violet is diminished.

*SOURCES OF RADIATION AND THEIR PHYSICAL CHARACTERISTICS, by W. W. Coblentz, Ph.D., D.Sc. Reprinted from The Journal of the American Medical Association, Aug. 9, 1930, by the Council on Physical Therapy.



Creative Studios, Inc.

MODEL FOR DYMAXION HOUSE, DESIGNED BY R. BUCKMINSTER FULLER

Light distribution by reflectors and prisms from central source placed in the supporting mast. Translucent ceilings. Intensity and color of light controllable from each room.

Type	S-1*	S-2	G-1*	*† Mazda CX 60-watt	*‡ Mazda CXt 500-wat
Watts lamp alone	315	130‡	36	60	500
Watts, with transformer	450	175	50		
Volts, operating	10.5	15‡	18‡	..(110, 115, 120, 28-32)..	
Maximum over-all dimensions in inches	6⅞	4⅜	4½	4 15/16	7⅝
Lumens per watt (lamp alone)	16.5	12-13	6.3†	13.1	21.5
Relative UV output in terms of S-1	100%	50%	7-10%	0.7%	8%
Useful life	(With average usage types S-1 and S-2 should last about one season.)		.....(500 hours each).....		
List Price	$7.50	$3.75	$3.50	$1.00	$3.50
Price of transformer (dep. on voltage and frequency)	$7.50-14.75	$3.00-800	$2.25-7.50		

* Inside frosted
† No transformer required for operation.
‡ Approximate figure.

Table II.
Comparative Data on Ultra-Violet Lamps
Incandescent Lamp Department of General Electric Company

Mazda Sunlight Lamp Type S-2

Employs the same fundamental design principles as the Type S-1 but the arc length has been increased. In addition an aluminum cap has been placed over the lower part of the bulb, increasing its efficiency by redirecting much energy back into the mercury vapor and light source area. The cap also performs an important function from the standpoint of fixture design. Since the downward radiation is redirected upward, the high bulb brightness normally reduced by diffusing glassware or baffles is not present. The electrical characteristics are similar to those of Type S-1. Special glass is used for this bulb.

Mercury Vapor Glow Lamp G-1

Consists of two parallel cylindrical electrodes—heated by incandescent filament internally placed—and a pool of mercury. The lamp produces ultra-violet radiation by a glow discharge in the mercury vapor throughout the entire bulb. The discharge is started by means of electrons emitted from the hot cathodes. The inside frosted special glass bulb permits transmission of biologically effective ultra-violet radiation but absorbs most of the undesirable short-wave radiation. The bulb is equipped with a standard medium screwbase but should not be operated without transformer. The lamp operates efficiently in any burning position. It constitutes a low power source for dual purpose installations.

Mazda CX Lamps

Special glass bulbs that transmit ultra-violet radiation within the biologically effective region produced by incandescent filaments operated at relatively high temperatures. Two sizes—60 watt and 500 watt—have been produced commercially for standard lighting service voltages. These lamps do not require transformers for operation; they will operate directly on either A.C. or D.C. lighting circuits. They are low sources of ultra-violet radiation and are used particularly in animal and poultry husbandry where animals and birds can be kept close to them for long periods of exposure.

Gaseous-Tube Lighting

High-intensity low-voltage hot-cathode tubes operating on standard lighting circuit voltages of 110-220 volts, 25 or 60 cycle, as compared to voltages of from 5000 to 14000 volts for standard neon cold-cathode tubes have been announced by the Claude Neon Lights, Inc. These tubes will also operate on D. C. with the use of a small transformer. The tubes are available in three colors, red, blue and green. The red tubes have from eight to ten times greater intensity than the standard neon tubes; the blue and green tubes from three to four times the intensity. Tests indicate a minimum life of 3000 burning hours.

The tubes are used for sign lighting, interior lighting, show window lighting, floodlighting, aviation indicators and beacons. Combinations of properly placed tubes in connection with reflector and control-lens equipment are used to produce subjectively white light. A specially designed fixture for industrial purposes uses green and red tubes producing subjectively white light and emitting ultra-violet down to A°2850. The ultra-violet radiation can be adjusted to suit requirements or eliminated altogether. Wattage: 700 to 800 dependent upon voltage and frequency. Efficiency: 17 to 20 lumens per watt.

Announcement has also been made of a gaseous-conductor single-tube unit producing subjectively white light.

The nature of the gaseous-conductor lamps as continuous line-sources of light with reduced source brightness and high efficiency and utilization factor make them especially suited for integral interior lighting. Recent work in producing moving luminous phenomena in the tubes themselves points to new possibilities in lighting control.

The Claude Neon Lights, Inc., also announces a new floor type sunlamp. Voltage: 110 volts, D.C. or A.C., 25 or 60 cycle. Wattage: A.C. 80 to 120 watts, D.C. 200 to 250 watts. Ultra-violet radiation: A°2850 to A°3100. Average life: 1500 hours

*A comprehensive tabulation of gaseus-conduction lamps appeared in the August issue of ELECTRICAL ENGINEERING in a paper by D. F. Moore.

MOVIE THEATER, FLAMMAN, STOCKHOLM, UNO ÅHREN, ARCHITECT

The characteristic line sources of the neon tube signs used as an integral part of the design. The extensive glass front makes the lobby a flexible show window with provision for poster exhibits. Walls: yellow and caput mortuum. Ceiling: mat silver. Columns mirrored. Interior shown on pages 286 and 288.

New Incandescent Lamps

Watts	Volts	Max. Over-all Length in Inches	Bulb Diameter	Life Hours	Approximate Initial Lumens	List Price
5	115	1 7/8	3/4	1500	35	$0.30
40	115	4 1/4	2 3/8	1000	424	.20
100	115	34	1 1/2	1000	940	5.25
150	115	11 7/8	1 3/4	1500	1500	2.00
150	115	6 15/16	3 1/8	1000	2340	.65
200	115	8 1/16	3 3/4	1000	3340	.85
300	115	9 7/16	4 3/8	1000	5430	1.35
500	115	9 15/16	5	1000	9650	2.15

Table III.
New Lamp Developments
General Electric Company

The 40-watt gas-filled lamp for 110, 115 and 120-volt general lighting service has replaced the older vacuum type. The latter is still available for sign lighting service, because, when used outdoors, the gas-filled lamp must be protected from rain and snow. The 40-watt gas-filled lamp will normally consume about 2½ per cent more kw. hr. during its life than the vacuum type lamp, but the average lumen output will be about 10 per cent greater.

The 100- and 150-watt tubular bulb Mazda lamps are produced for use in built-in lighting, showcase lighting and cove lighting where a long continuous source is essential.

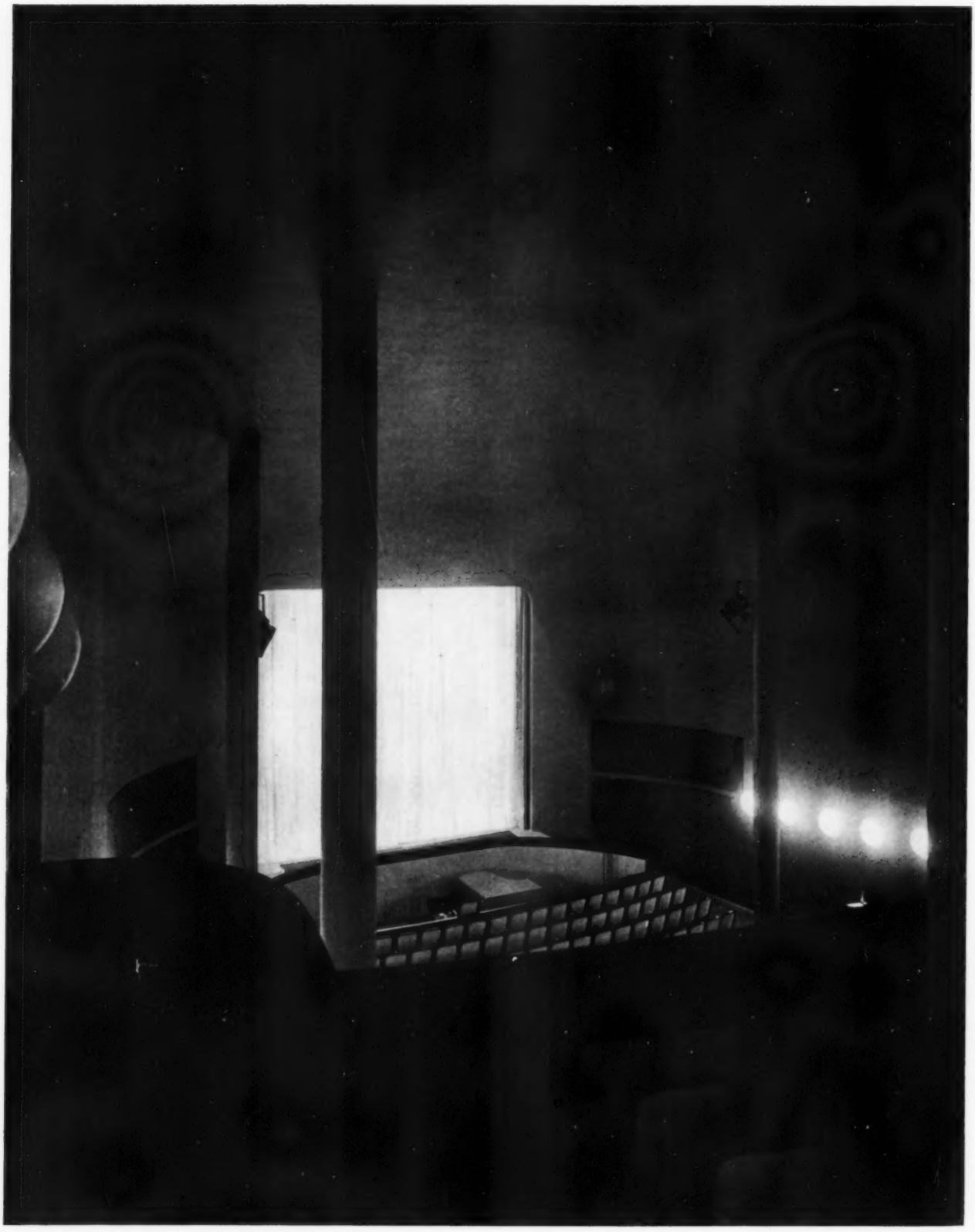
Lamps of 5 kw. and larger size are now being made in heat resisting glass bulbs which do not devitrify at the temperature at which they must operate. The manufacturers are ready to supply lamps as high as 50 kw. in size. The tungsten-powder mechanical cleaner has increased the average light output during the life of the lamps to which it can be applied by nearly 45 per cent.

A water-cooled lamp in sizes up to 1500 watts has been announced by the General Electric Company for use in operating rooms in hospitals, store window displays, boxing rings, movie studios and other places where intense illumination with a minimum amount of heat is required. The elimination of the heat is accomplished by absorbing the heat rays in distilled water surrounding the bulb. The heat is carried away from the liquid by means of a cooling coil through which water is circulated.

»Berliner Bild-Bericht

GYMNASIUM, W. GROPIUS, ARCHITECT

Lighting with suspended tubular incandescent frosted glass lamps.



MOVIE THEATER, FLAMMAN, STOCKHOLM, UNO ÅHREN, ARCHITECT

Attention is focused entirely on the screen. The walls and ceiling are painted deep blue and the light sources are placed low in order to make the audience unaware of all parts of the room except the screen.

LIGHTING FOR VISION*

Seeing is the fundamental purpose to be served by a lighting system. With artificial light controllable in every respect—quality, quantity, distribution, diffusion and direction—we have control of the external means by which optimal visual conditions can be secured.

The part played by the condition of the eye in making full use of the external means provided for seeing is not discussed here.

There are four fundamental factors in seeing: (1) the size of the object, (2) its contrast with the background, (3) its brightness, and (4) the time allowed to see it. Satisfactory vision depends upon establishing these four factors "above certain limiting values" and arranging the best relation between them to meet the needs of each individual case. Fig. 2 shows the interdependence of these four visual factors.

The size of the object is usually beyond the control of the lighting specialist and the time of exposure or speed of seeing is generally controlled indirectly by the degree to which the brightness of the object is raised. The lighting specialist can usually control only two of these four factors directly, the brightness of the object and its contrast with the background.

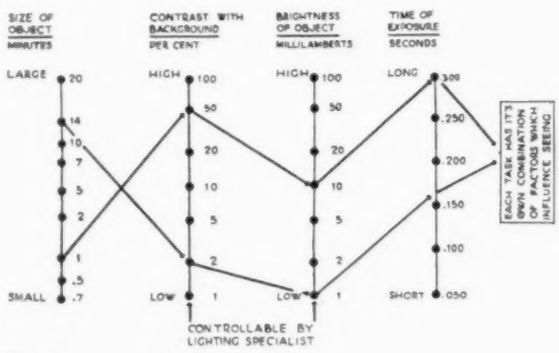


Fig. 2

Clear seeing results when fundamental visual factors are above certain limiting values. These fundamental factors are mutually complementary; that is, a deficiency in one may be compensated by the augmentation of one or more of the other factors. In this figure, the two combinations of visual factors describe conditions of equal visibility.

Intensity

In considering the brightness of the object, the amount of light to be used is the first point to be decided. Raising illumination improves vision (see Fig. 3). It also compensates for eye defects (see Fig. 4).

Opticians test eyes with the Snellen chart under comparatively low intensities. Defects then appear that do not show up under higher intensities. Raising illumination helps people with defective sight (45 per cent of all) more than people with normal sight.

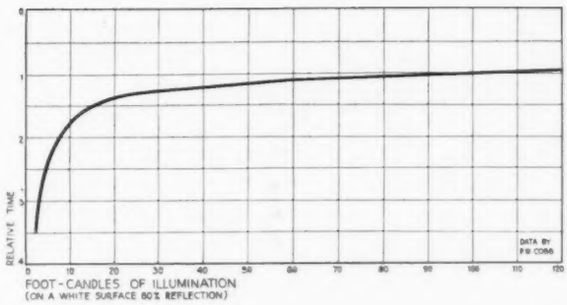


Fig. 3

Time and Light required for Perception

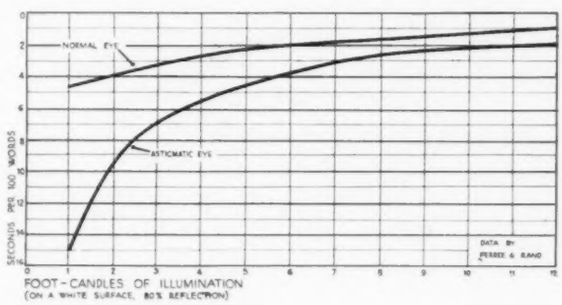


Fig. 4

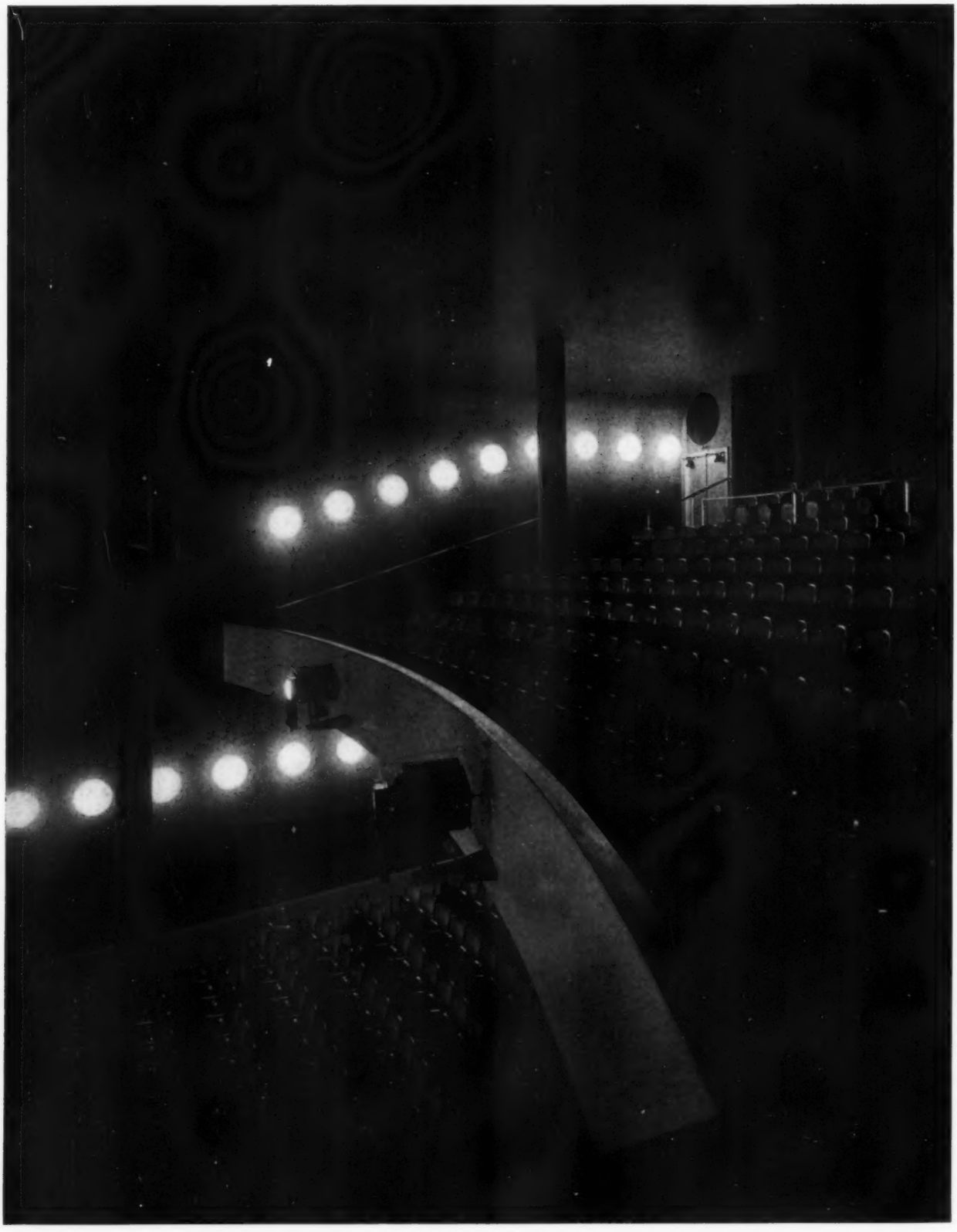
Time and Light required for Discrimination. Astigmatic vs. Normal Eyes

The eye takes pictures like a moving picture camera. The film comes to a stop for a brief fraction of a second, then moves on to the next strip. The retina of the eye likewise must be stationary with respect to the object viewed in order for the picture to register. If the eyes are held steady and the hand is moved rapidly before them, no picture is received—just a blur. The rate at which the eye "takes pictures" varies greatly under different conditions, but in the act of reading the rate seems to be fairly well established at from 2 to 14 complete impressions per second, which, all other factors being equal, depends upon the amount of light on the page.

Performance curves for the eye are of the form of efficiency curves for electric motors. It is not general practice to operate motors on the lower part of the curves which represent low efficiency. It is good practice to operate them at the highest efficiencies. So it should be with the eye.

Fig. 3 shows that the knee of the curve is fairly well past when the illumination is such as to equal that of 20 to 30 foot-candles on a white surface. A gain from 10 to 30 apparent foot-candles is too low to be economic under ordinary circumstances. Up to 20 to 30 foot-candles the gain is worth while securing. An examination of the other functions of the eye discloses the same fact, namely, that the eye is functioning with sensible maximum

*By H. L. Logan, Engineering Consultant.
**Lighting for Seeing, by Luckiesh and Moss.



MOVIE THEATER, FLAMMAN, STOCKHOLM, UNO ÅHREN, ARCHITECT

The built-in dimmer-controlled lighting equipment follows the slope of floor and balcony, lighting seats and aisles. The lights serve also to indicate exits.

efficiency when the brightness of the field of view is equivalent to 20 to 30 foot-candles. This seems to be the standard toward which artificial lighting is generally working. Incidentally, 20 to 30 foot-candles is the average intensity in well-lighted industrial plants in the daytime. To remove the question of the desirable lighting intensity for any given purpose from the realm of guess work and trial, the Illuminating Engineering Society, the various lamp manufacturers, and the leading equipment manufacturers publish recommended tables of lighting intensities for different operations.*

Distribution

After the proper amount of light to be used has been determined the next point to be considered is the method of distribution. Different kinds of work have different critical details and thus need different light patterns applied to them. (By "critical details" are meant those particular features of a field of view that are important for, or identify it to, an observer.) Raising illumination intensities does not change the critical details, and in the absence of a proper distribution of the light may not make them more visible. The illumination of the background should as a rule be uniform with the critical details picked out more brightly either by combining special local lighting with the general illumination or by using control devices that will emphasize the critical details, while at the same time lighting the general field evenly.

Where seeing has to be performed in a field with sharp variations in the illumination the relative rate of work is slowed up. The following test reported by the National Lamp Works illustrates this:

	FOOT CANDLES		
Lighting Condition	Left Area	Right Area	Relative Rate of Work
Uniform Illumination	20	20	100.0
Unequal Illumination	20	5	96.8
Uniform Illumination	20	20	100.0
Unequal Illumination	20	1	89.9
Uniform Illumination	5	5	100.0
Unequal Illumination	5	1	92.7

Table IV.
Working Under Assorted Illumination

Two general types of distribution are used, symmetrical and asymmetrical. Symmetrical distributions are used for the lighting of office spaces, schools and most commercial interiors. They are of three types; extensive, intensive and focusing. The asymmetric distributions find their greatest field in industry, street lighting, highway lighting, aviation lighting, sports lighting, hospital lighting, stage lighting, show window lighting, and certain specialized areas in the interiors of commercial and public buildings. With the increase of clearly defined functions in illumination, the asymmetric distributions are likely to be more widely used. The lighting specialist who is familiar with these distributions is able to meet the "seeing" requirements of most circumstances. The science of light control is sufficiently advocated to make possible the development of lighting equipment that will have the exact type of distribution desired.

The extensive type of distribution is, generally speaking, best adapted to office and store space where the working plane is not interrupted by vertical surfaces that would interfere with the widespread light at the higher angles getting down to the work points. Intensive distributions in general are more adapted to industrial problems where the vertical members of the machinery prevent light at extensive angles from reaching the work.

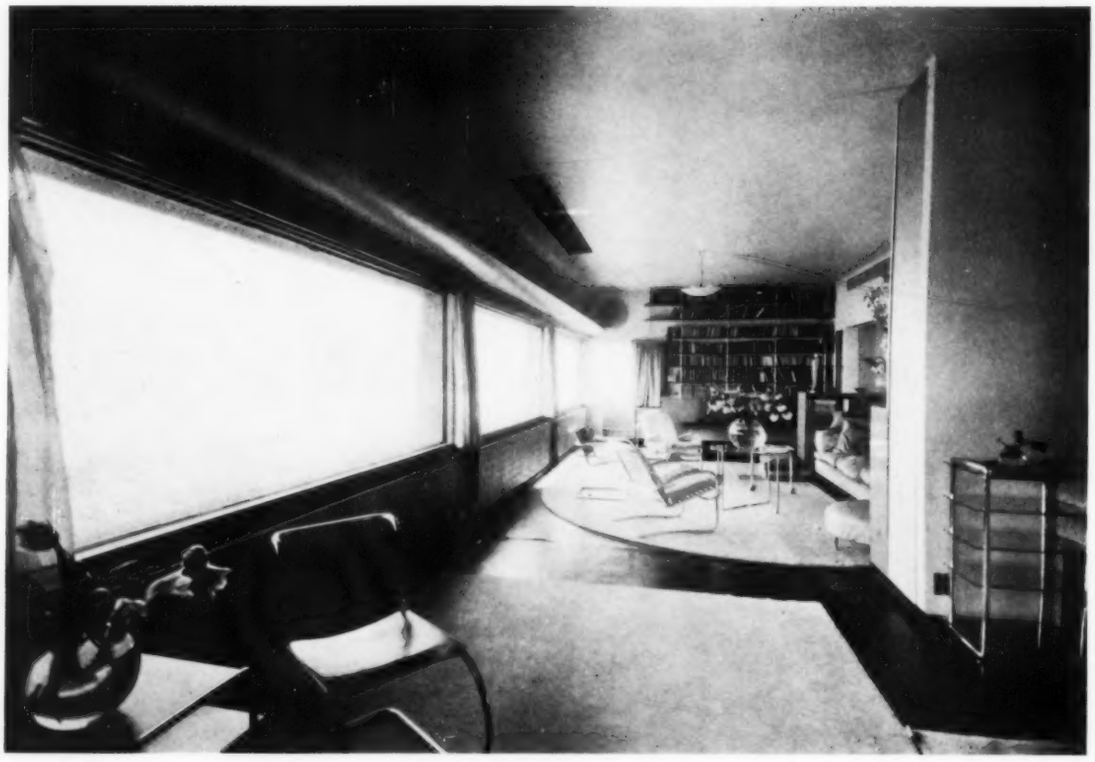
Diffusion

The quality of the light is the third factor to consider. Too much diffusion hampers vision as well as too little.

Absence of shadows as well as black shadows make seeing more difficult. In the daytime shadows from combined sun and skylight are about one-tenth as bright as the surrounding field. Outside daylight intensities are so high that the illumination in daylight shadows is still sufficient to permit satisfactory vision. Artificial intensities are too low to permit shadows to be only one-tenth as bright as the general field. They should never be less than one-quarter as bright and, in general, should represent a reduction in the brightness of the general field only sufficient to permit the clear seeing of objects in three dimensions. It is most important that these shadows have no sharp edges, but gradually dissolve into the general field. Abrupt changes in illumination intensity, as pointed out previously, retard vision.

If the illumination is shadowless the advantages of binocular vision are to some extent exchanged for the disadvantages of monocular vision. With two eyes operating each eye sees the object a little differently. The brain combines these two views to show the object in three dimensions. If the light is so well diffused that it is the same on all sides of the object, the object looks flat instead of appearing in relief. This type of visual misjudgment is characteristic of interiors lighted with shadowless illumination. The scene appears flat, monotonous and uninteresting. It is difficult to judge distances, proportions and relative surfaces with accuracy. Some shadow is necessary. Deficiencies in vision experienced under highly diffused illumination are similar to those occurring through the loss of one eye.

*See NEW CODES, LIGHTING DATA AND MINIMUM SPECIFICATIONS, page 302. A comprehensive summary of literature dealing with the dependence of visual functions upon the intensity of the stimulus has been published in the *Transactions of the Illuminating Engineering Society*, Vol. XXVI, No. 2, February, 1931.



HOUSE VAN DER LEEUW, ROTTERDAM, BRINKMAN AND VAN DER VLUGT, ARCHITECTS

Daylighting and electric cove lighting planned to light the room from the same side and angle. The two light sources can be used together without causing conflicting shadows. Built-in panel on the wall facing the window.

Glare

Glare may greatly reduce the beneficial effects of the proper balance of the first three factors. As a rule, a bright light directly in the line of vision prevents one from seeing objects in the nearby surrounding field because the difference between the intensity of the light and nearby objects is so great that the eye cannot adapt itself to both levels at the same time and is forced to attempt to adapt itself to the higher. It does this, first by protectively reducing the opening of the pupil, which reduces the amount of light entering and thus lowers the illumination on the retina; and secondly by changing the sensitivity of the retina to match the incoming light. Glare interferes with vision and produces a sensation of discomfort, but its deleterious action is often overlooked. Reflected glare operates in the same way. It can be avoided by depolishing the surface viewed and thus diffusing the reflected glare to a point where it ceases to be sensible, or by sufficiently reducing the wattage of the light source, moving it farther away (usually by raising it) or increasing its area (using a larger lighting unit).

However, in most cases the offending glare is not seen in the central field of view but nearer its edges, and its glare effect falls on the outer area of the retina instead of the central area. This glare depresses vision although it frequently does not cause discomfort. This depression of vision can easily be realized by shading the eyes from the lighting units on the ceiling and looking at the room with the units thus hidden. The "clearing up" sensation and relief felt is quite striking, even though before shading the eyes the observer was not conscious of either discomfort or interference with vision.

Glare is due to excessive variations in the light falling on different parts of the retina. While no rule can be positively established a glare sensation begins to be definitely felt in most cases when this inequality exceeds the proportions of 100 to 1. A lighting source depresses vision and may cause discomfort when not directly viewed, provided it is somewhere in the field of view enclosed by the eyes. The nearer it is to the line of sight the more it depresses vision. At ordinary ceiling heights most luminous units should be mounted directly on the ceiling. Despite lowered intensities on the working plane visual efficiency will be higher, owing to the fact that the pupil will expand more freely and thus let in more light, which tends to compensate for the reduction in intensity. In cases where light sources must be placed in the normal field of view, their brightness should be reduced as much as possible and the contrast with the background kept inside the limit of the 100 to 1 ratio.

The pupil contracts when the eye is exposed to glare but the reverse side of this contraction is often overlooked. All other things being equal, "stopping" down the pupil reduces the amount of light entering the eye and hence puts a darker picture on the retina. The fundamental factor in vision is the brightness of this picture. In the absence of glare the pupil automatically expands to its normal opening for the particular intensity of the moment, which is relatively equivalent to increasing the light outside the eye.

Color

In general, the whiter the light the better the vision. North light has been the accepted standard for centuries but the true white light is noon sunlight. In the past, when artificial light was entirely unsuitable for color discrimination, those interested in color chose north skylight because it was more nearly constant in quantity and quality than light from any other region of the sky.

"The illumination most suitable for color work is one that does not favor any particular color. Such a light is one in which the radiant energy is equal in amount for all wave lengths of the visible spectrum-white light. Noon sunlight comes closest to his specification in nature. North light is quite bluish and makes purples (pink, lavender, magenta, etc.) appear more bluish. Because of its deficiency in yellow, orange and red, north light suppresses these colors."*

Daylight

Average daylight is a mixture of skylight and sunlight. The addition of skylight tends to make the total daylight bluish as compared with noon sunlight. The collective absorption of the atmosphere tends to modify the sunlight as the sun passes from the zenith to the horizon, toward yellow and even red.

Average daylight throughout the day is an uncertain quality. It may safely be considered to be yellower than noon sunlight. On clear days the sky contributes only 10 per cent of the illumination on the horizontal surface and on average clear days a maximum of 20 per cent., the rest coming directly from the sun. There is no standard of daylight. Neither is there an essential difference between daylight and ordinary electric light, as daylight passes through phases on the average day that have characteristics similar to the light furnished by Mazda C lamps. Controllability, flexibility and divisibility of electric lighting for certain purposes—especially industrial buildings and department stores where constant levels of illumination are desirable—have made electric lighting more economic and efficient than daylighting. The factory of the Simonds Saw and Steel Company at Fitchburg, Mass., now under construction, has been designed without provision for daylight and relies entirely on electric illumination. In general, more money is spent to daylight buildings than to electric light them, and artificial light is usually necessary to supplement daylight the greater part of the time.§

*From *Lighting Research Narrative No. 7*—Nela Park.
§See LIGHT AND WORK by M. Luckiesh, D. Van Nostrand Co., New York.

Holophane Company, Inc.

OPERATING ROOM LIGHTING WITH MULTIPLE CONTROL LENS SYSTEM

Holophane Company, Inc.

DELIVERY ROOM LIGHTING WITH CONTROL LENS UNITS

Lighting with Control Lenses

Increased levels of illumination, increased concentration of light sources and increased differentiation of functions to be performed necessitate new forms of equipment for the practical application of the preceding principles. Lighting systems must be flexible and must be designed to fit special conditions as an integral part of a structure, supplemented, if necessary, with movable lighting devices for specific purposes. An increasing number of problems require asymmetric distribution of light. Ward Harrison of the National Lamp Works prophesied to the Architectural Lighting Conference in Chicago in May, 1930, that—"The genius of American business to standardize may bring us a relatively small number of standard parts which in their permutations and combinations may meet the needs of an almost incalculable variety of lighting installations, and which will be satisfactory from the efficiency and maintenance standpoint, as well as that of appearance."

Such a system of standard parts which can be combined into any number of shapes and arranged with reference to light sources so that the distribution can be "tailored" to suit the lighting needs has been constructed of lenses of different sizes, shapes and focal lengths. (*Holophane lenses*).

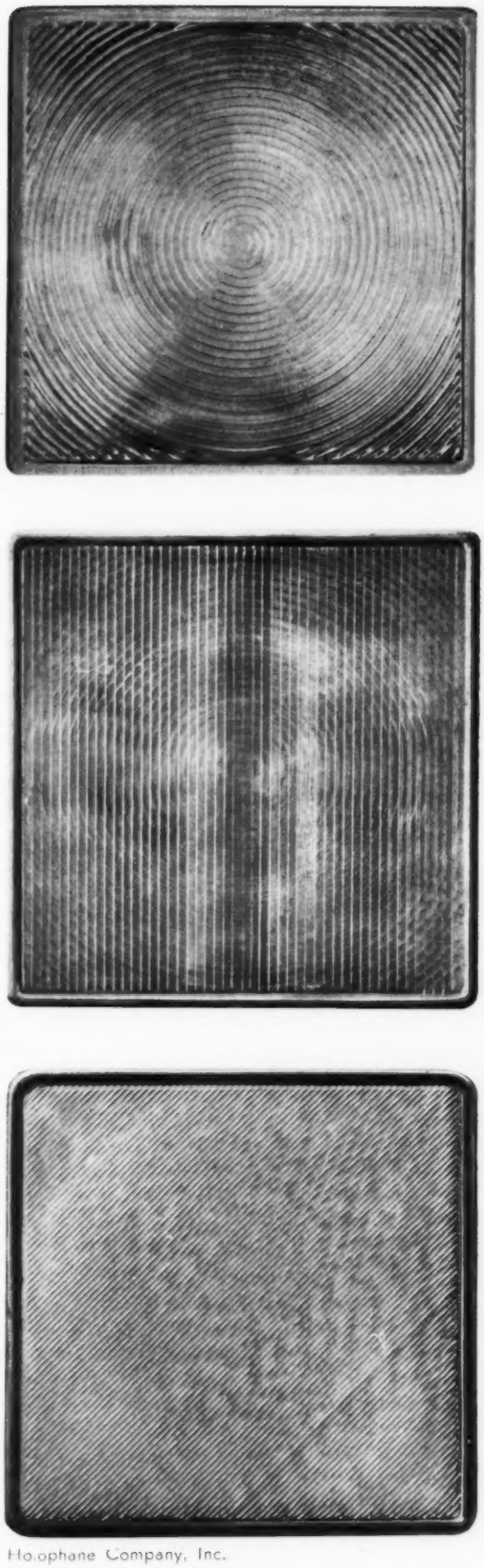
All control lenses are based on the same fundamental optical elements. These elements are in the form of four patterns: circular, straight, angular, and combination. They are illustrated on this page.

Lenses with circular patterns are of the plano-convex type developed by recession from the plano-convex section to a flat plane. Those with straight patterns are developed by recession from cylindrical or sinesoidal curved surfaces.

Lenses with angular patterns are of true prismatic construction, with a lens structure imposed on the prisms at irregular intervals for the purpose of causing a satisfactory spread to the light, parallel to the direction of the prisms.

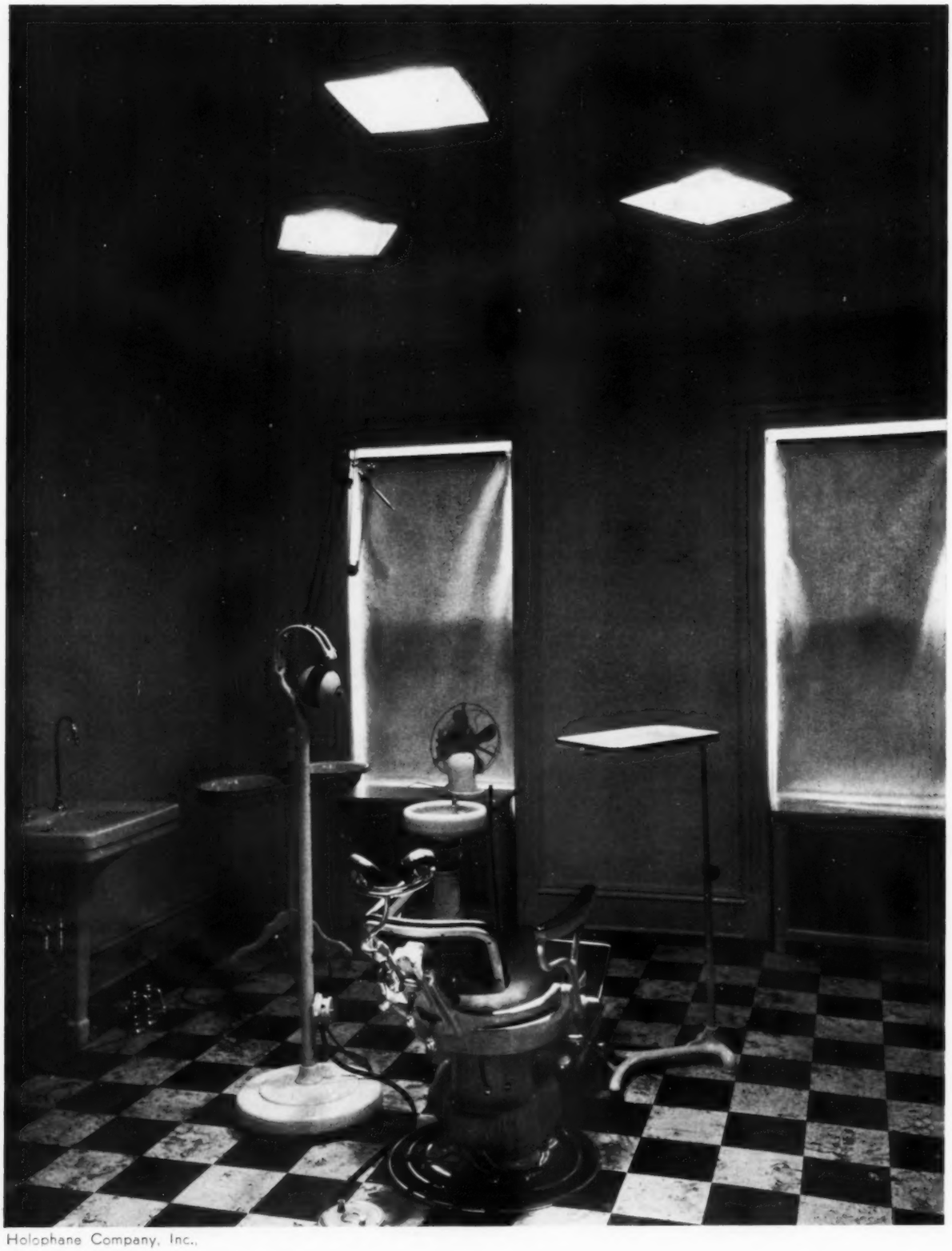
Combination control lenses usually consist of a lens with a circular pattern used in conjunction with one having a straight pattern. Either of these lenses or both of them may be curved in one or more planes. The effect of the usual combination is to narrow the spread in one direction so that what would otherwise be a circular beam in cross section becomes an elliptical beam, with the major axis the same as the diameter of the circular beam.

These varied combinations make possible a wide variety of light distributions and a large field of usefulness. The width of spread of the beam from individual lenses may be varied between 20 degrees and 60 degrees by a perpendicular lamp movement, while both the spread and direction of the distribution may be changed by lateral lamp movements, parallel to the plane of the lens. A maximum effective change in the direction of the beam of 30 degrees may be accomplished with the lens held in one plane. In this



Holophane Company, Inc.

Various types of control lenses. Top, circular pattern; center, straight pattern; bottom, angular pattern.



Holophane Company, Inc.

SPOT LENS UNITS FOR DENTAL SURGERY

The light is focused on the working plane. Part of the light flux is deflected for general illumination. All details are clearly lighted.

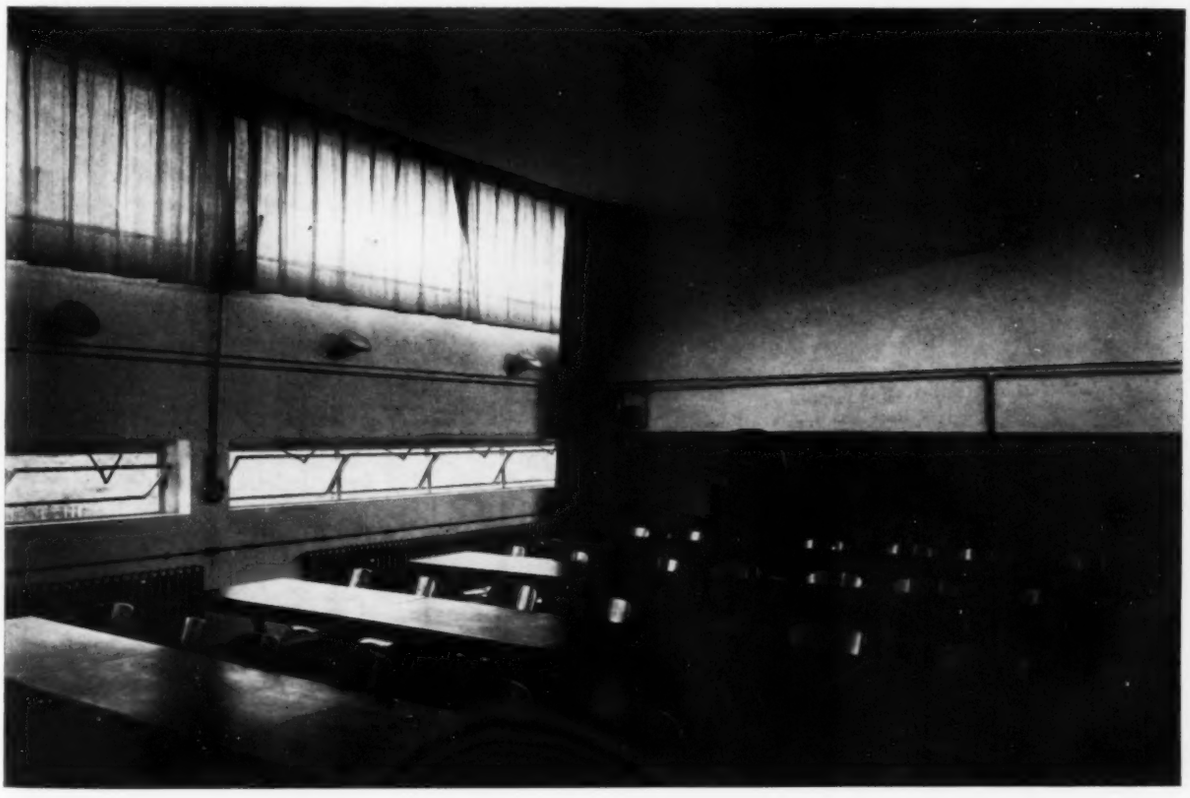
fashion asymmetrical distribution can be secured from lenses that are horizontal in a ceiling. Further, the shape of the distribution can be affected by combining different lenses so as to properly light areas that are greater in one dimension than another.

Another large group of distribution changes can be brought about by mounting the lenses in planes that are at angles to each other. In this way, the Dance Hall at Playland, Rye Beach, New York, was lighted by a continuous lens beam in the form of a horizontal wedge, located at the intersection of ceiling and walls, the upper strip of lenses lighting the ceiling, and the lower lenses the floor with a single lamp common to each two lenses.

These lenses involve a conception old to optics—the principle of what has been referred to as the "optical train." The "optical train" consists of a light source, a combined specular and diffuse reflector and a simple or compound lens, the elements so placed in relation to each other as to deliver the light from the lens in a predetermined manner. The relations of these elements can be changed to vary the results within wide limits.

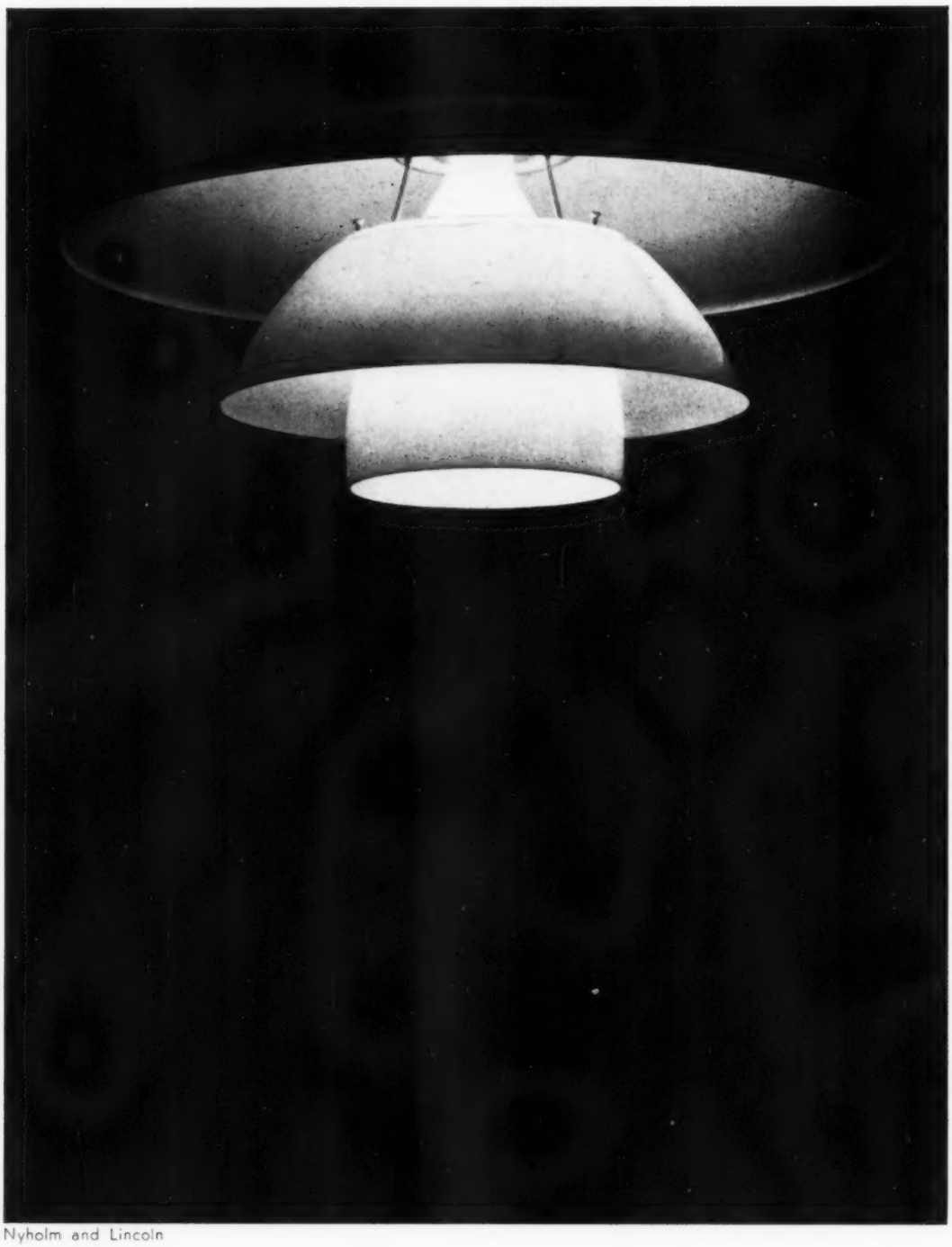
The chief advantages of the lens systems are their flexibility; the fact that they permit the lighting systems to be made to fit exactly the conditions; the sharp and accurate light control that combines high intensities with freedom from glare; the quality of the light due to the high degree of diffusion that characterizes the use of extended sources; their pleasing appearance and the ease with which they lend themselves to architectural applications, as built-in. The cost of the lenses, including wiring and boxes, varies from $7.00 to $20.00 per lineal foot.

Although the output of a lens system is sometimes relatively low when compared with standard commercial units, its output in the operating zone with its emphasis of critical details, and therefore the utilization efficiency, is relatively high. Where a great deal of flux is needed in a restricted zone the control lenses are a particularly efficient means of obtaining it. Applications of the lenses are shown on pages 292 and 294.



CLASSROOM LIGHTING, SCHOOL IN BERNAU, HANNES MEYER, ARCHITECT

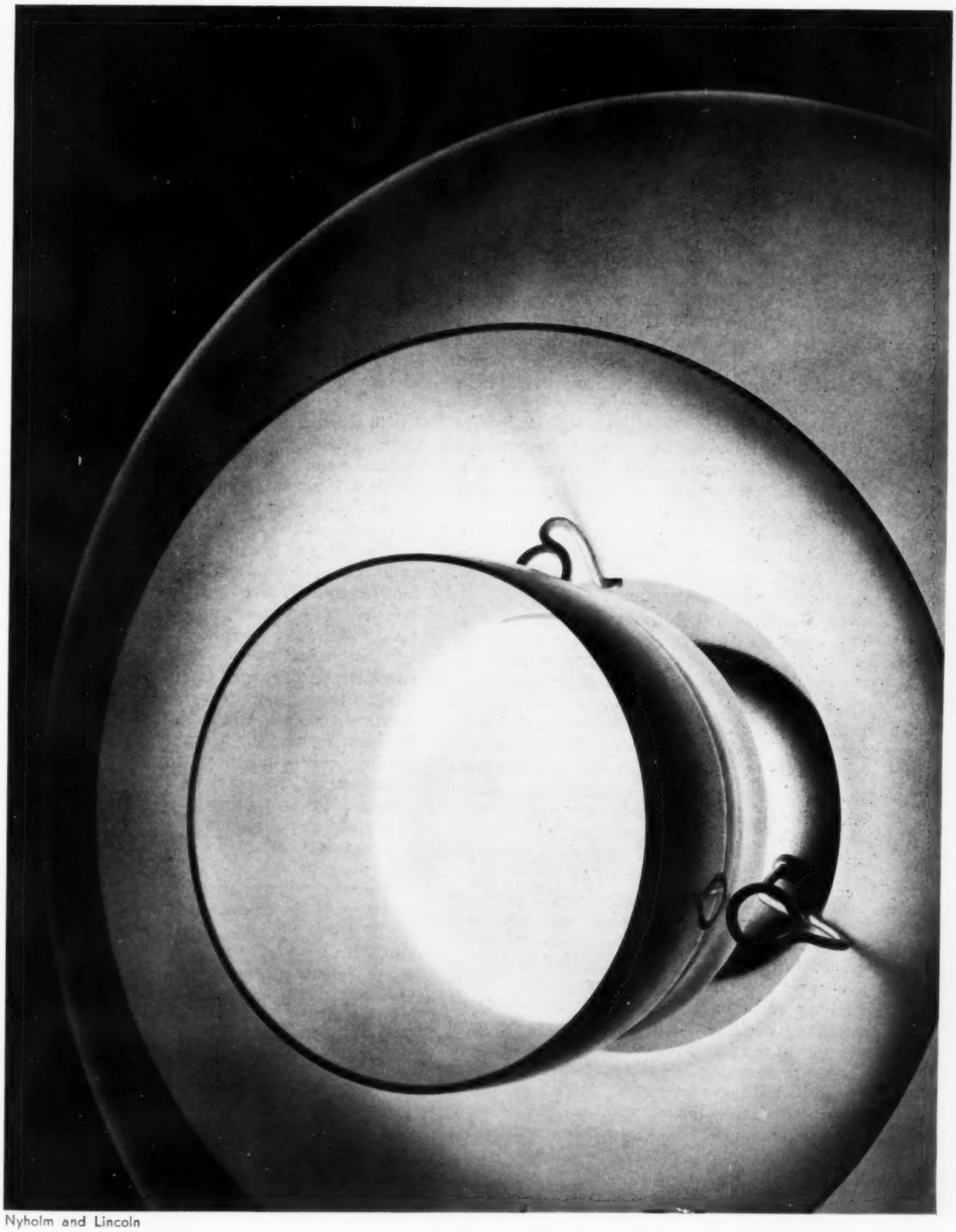
Indirect lighting from projectors mounted on the wall. The sloped ceiling controls light reflection and aids natural ventilation. The electric light can serve as an auxiliary to daylight without producing conflicting shadows.



Nyholm and Lincoln

P. H. LAMP REFLECTORS

Efficient glareless distribution of light. Three reflectors designed as logarithmic spirals and a bottom shield placed concentrically one above the other. The light from an incandescent lamp placed in the center of the combination, hidden from the eye, is diffusely reflected down from the dull bottom surfaces of the reflectors. Top of reflectors polished. The bulb is ventilated and the reflectors are easily cleaned. Dust accumulations will settle on top of shades without lowering efficiency. Distribution curves can be varied with material of reflectors. They are made of opal, frosted and colored glass and of lacquered or silver-plated metal for intensive distribution.



Nyholm and Lincoln

LIGHTING FOR HEALTH MAINTENANCE

Powerful sources of ultra-violet radiation, such as quartz mercury vapor and carbon arcs, are used by the medical profession for therapeutic purposes. Ultra-violet radiation is finding industrial applications, especially in food preparation. The Mazda CX lamps are used in poultry raising. The tungsten mercury arc lamps, S-1 and S-2, and the G-1 lamp are finding fields of application for health maintenance in homes, offices, playrooms, nurseries and gymnasiums. A combination of mercury vapor tubes, some of which are of ultra-violet transmitting glass, and incandescent lamps will be used in the Simonds Saw and Steel Company's plant mentioned before. This combination provides light subjectively white in color quality.

The extension of electric lighting to include radiant energy as an aid to health maintenance has been termed *dual-purpose lighting*. Various combinations of ultra-violet and ordinary luminous sources are now produced commercially.

The Council on Physical Therapy of the American Medical Association makes the following comments on the present status of ultra-violet lamps, commonly known as sunlamps:

"No sunlamp on the market has been approved or accepted by the Council on Physical Therapy. The S-1 and S-2 and G-1 lamps have been submitted to the Council on Physical Therapy for consideration. . . . Up to the present time no conclusive evidence has been found acceptable to the Council on Physical Therapy and that justifies the claims made by sunlamp manufacturers in advertising for health benefits such as protection against colds, raising the body resistance and keeping people well."* (Editor's note: The S-1, S-2 and G-1 lamps are not marketed by the manufacturers as therapeutic lamps.)

The Council takes the stand that advertising matter shall contain no curative claims nor mention of specific diseases and that statements be restricted to those which can be justified by conclusive scientific evidence; furthermore, that in advertising attention is called to the advisability of consulting one's physician before exposing one's self to ultra-violet radiation. The Council states that the more responsible manufacturers have fully agreed with the opinion of the Council and that the emission characteristics of their lamps are in essential agreement with the requirements established by the Council.†

Biological Value

Many scientific facts have established the value of sunlight as a preventive and curative of certain diseases, especially rickets. Fewer specific facts are known regarding the value of sunlight in the general maintenance of health. The importance of sunlight for health maintenance, however, is supported by the instinctive recognition or use of sunlight as a remedy or tonic. Statistical records on relationship between death rates and average number of hours of sunshine throughout the year yield much evidence that sunlight is of direct benefit for human beings. The bactericidal power of ultra-violet radiation is effective in sterilizing the general surroundings, thus reducing the danger of infection. Fig. 5 shows the spectral range of most importance to human beings.

The lower limit of radiation present in sunlight as received on the earth is generally specified as A°2900, but very little radiation of this wave length reaches the earth's surface. In most places there is little energy shorter than A°2950, and when the sun is low in winter or in smoky cities A° 3100 is sometimes the limit. The spectral cut-off of ordinary or of most special glasses furthermore reduces the amount of ultra-violet radiation present in sunlight which reaches interiors of buildings. (Ordinary glass passes none of the biologically effective ultra-violet radiation. See GLASS, The Architectural Record, October, 1930, pp. 339-343.)

It has been assumed that one of the most important spectral ranges for health-giving purposes is close to the short wave end of the solar spectrum, extending chiefly from A° 2800 to A° 3100. Within this range it appears that two important maxima exist—the maximum of production of vitamin D and the maximum of antirachitic effectiveness. However, other and shorter wave regions have their special usés in rapid erythema (reddening of the skin), oxidation, sterilization ad possibly many industries.

There is evidence that the increased resistance to infection that results from the use of light is not due solely to its anthrachitic ultra-violet and that the visible and short wave infra-red radiation has a definite therapeutic and tonic value apparently due to its penetration of bodily tissue and are sometimes beneficial accompaniments to the action of ultra-violet radiation.

It is the opinion of many authorities in this field that the best results follow from the use of natural sunlight and that endeavors therefore should be directed toward a duplication of sunlight with its essential continuous spectrum. However, recent studies have shown that speed of treatment, or duration, has much to do with this and that no single quality can be selected for all usages.

The spectrum of artificial ultra-violet sources can advantageously be extended as far into the ultra-violet as is safe for the eyes, that is without causing conjunctivitis. A safe limit is set by the total volume of radiation shorter than about A°2800 than enters the eye.

*Information from the Council on Physical Therapy.
†The Sale of Sunshine Lamps to the Public. Report adopted by the Council on Physical Therapy of the American Medical Association.

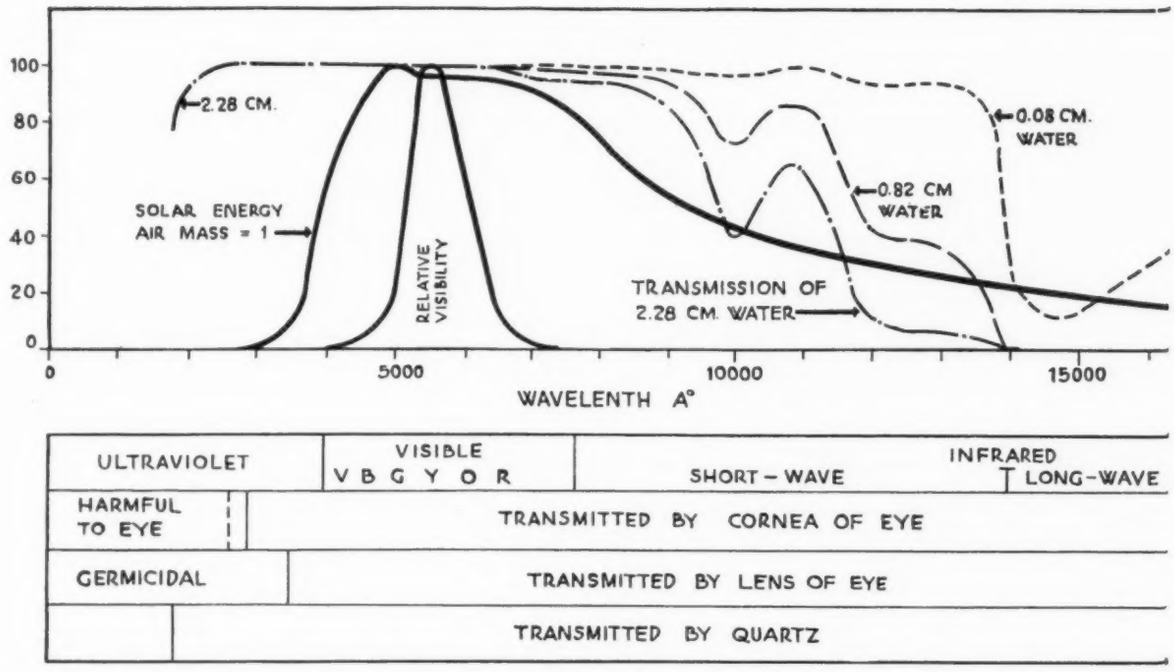


Fig. 5. The spectral range of most immediate importance to human beings (Luckiesh).

The Erythemal Basis for Measurement

Controlled use of ultra-violet radiation for health maintenance must be based on approved values of measurable dosages. The foot-candle-erythema basis is at present generally used in dual-purpose lighting design. There is no necessary biological connection between erythema and the beneficial effect of radiant energy, but the erythema effectiveness has been adopted as a practical method because the erythema producing radiation is ordinarily coincident in wave lengths with the biologically active radiation. Erythema is taken as proof that beneficial ultra-violet has been received by the skin.

The production of erythema upon average untanned skin has been studied both as a means of appraising biologically important radiation and as a limiting factor in the design of dual-purpose lighting. One-fourth to one-fifth of the total quantity of biologically effective energy (time times intensity) necessary to produce minimum perceptible erythema (MPE)—visible a few hours later—has been adopted by designers as being apparently of the order of the desirable daily dosage.

The time required for the production of erythema at 30 inches from the artificial sources is given in Table V.

The amount of ultra-violet radiation in dual-purpose lighting must be such that persons may work or read or engage in any activity for hours without over-exposure. Long exposures with relatively mild ultra-violet radiation replace short exposures with powerful sources. The average use of artificial lighting in the work world is in the neighborhood of three hours daily. There is an adequate factor of safety in the adaptability of the human skin to take care of variations in exposure to artificial lighting. Installations should be designed in each case for proper intensities in foot candles and proper total quantity of erythema producing radiation in one entire work period. The expedient of using two different illuminants on separate circuits provides the means of meeting these requirements.

	Degree of Erythema Minimum Perceptible	Vivid
Sunlight and skylight..... (at noon in midsummer)	20	50
Quartz mercury arc..... (3.5 amperes, 110 volts)	7	17
Sunlight (Type S-1)..... lamp, Corex D bulb (400-watt tungsten-mercury arc)	8.5	21
Bare carbon arc (1000 watt) .. (sunshine carbons)	16	40

Table V.

Minutes required for the production of erythema at 30 inches from the artificial sources. Exposures made through a quartz water-cell to eliminate part of the infra-red.

Measurements by Instruments*

The reaction of the human skin to ultra-violet radiation differs with individuals and according to other factors and at best requires considerable time to ascertain. A direct reading instrument has, therefore, been devised by which the quantity of ultra-violet in any selected period of time may be measured and by which the designer may know in

*From ARTIFICIAL SUNLIGHT, by M. Luckiesh, D.Sc.; D. Van Nostrand Company, Inc., New York.
*Information supplied by Engineering Department of the Westinghouse Lamp Company.

advance how to choose the right number and size of ultra-violet lamps or fixtures. This instrument, known as the Rentschler meter, employs a rare metal, uranium, that passes more electric current in proportion to the total amount of ultra-violet striking it. This current charges a condenser and by measuring the time required to fill up the condenser, one can determine immediately what the ultra-violet intensity may be. No term has been chosen to measure ultra-violet quantitatively (the word "viol" has been suggested as comparable to the term "lumen," used in measuring visible radiation).

By the use of the Rentschler meter, the contours of reflectors and the correct placement of ultra-violet sources is easily ascertainable.

Transmission of Ultra-Violet Radiation

Few materials are transparent to the biologically active ultra-violet rays. All forms of ordinary crystal glass, white glass and mirrored glass used at present in general lighting equipment are unsatisfactory for the transmission of ultra-violet energy. The only ultra-violet transmitting media which seem practical for present-day use in lighting equipment are fused quartz and frosted plates of pebbled Corex-Pyrex, or similar glasses essentially free from iron, etc. Neither of these two media has been developed sufficiently to be entirely satisfactory for unlimited use. The present trend in ultra-violet equipment design is therefore toward the use of good reflecting surfaces rather than diffusing glasses.

Reflection of Ultra-Violet Radiation

With the development of artificial sunlight, reflecting media must perform the dual purpose of efficiently reflecting biologically active ultra-violet radiation as well as light. This greatly reduces the number of materials which can qualify.

	Per Cent Reflection of Radiation between 2800 and 3200 A°	Per Cent Light Reflected
Oxidized Aluminum	65-80	75-85
Polished Aluminum	40-45	55-70
Polished Chromium	55-60	63-65
Porcelain Enamel	4-6	65-75
Mirrored Glass	3-5	85-90
Lead Paint (White)	20-25	75-85
Zinc Oxide Paint	1-2	75-85
White Paper	45-50	75-85
White Plaster	40-50	85-90
Aluminum Wall Paper	60-70	75-85

Table VI.
Reflection Factors of Materials
General Electric Company

Table VI gives reflection factors of a few materials of general interest.

Aluminum and chromium are both fairly good reflectors of ultra-violet radiation of known biological value. Of these two, aluminum has some advantages in that it may be given an oxidized or semi-mat finish which increases its reflection factor and directional control without striations. It is light in weight, readily available and inexpensive. Zinc oxide, although an excellent reflector of light, absorbs most of the ultra-violet. Few colored materials reflect as much as 10 per cent of the ultra-violet of interest. Most of them reflect less than 5 per cent. Aluminum paint consisting of lacquer and powdered aluminum reflects from 40 to 50 per cent of the energy between A° 2800-A° 3200. White plaster is quite effective and may be mixed with powdered aluminum. Development work is now being done on various new paint compositions, wall paper and tiles. These developments point toward the practicability of indirect or semi-indirect lighting but for the present ultra-violet radiation equipment is made largely in some form of direct types which control and diffuse both the ultra-violet and visible radiation.

Equipment

The design of fixtures for single and dual-purpose lighting is based on the fundamental principles of light control but must also solve the problem of conserving ultra-violet radiation through selective transmission and reflection. The ultra-violet radiation is generally emitted downward with wide distribution to prevent it from being absorbed by walls and ceiling. As the periods during which light is required for most interiors usually are greater than the desirable exposure periods for ultra-violet radiation which would accompany the visual intensities obtained especially from the S-1 lamp, these lamps are usually installed only to provide a sufficient quantity of health radiation and are placed on separate circuits from the regular lighting system so that they may be turned off and on at will with or without the use of general illumination. Incandescent lamps are used as component light source.

Oxidized aluminum reflectors are used to control the radiation and oxidized aluminum baffle rings or louvers are used to screen the lamps from lines of vision. The G-1 lamp is a source of low brightness and can be used without shielding accessories.

References

CLINICAL APPLICATION OF SUNLIGHT AND ARTIFICIAL RADIATION. By Dr. Edgar Mayer. Published by Williams and Wilkins, Baltimore, Md.

ARTIFICIAL SUNLIGHT. By M. Luckiesh, D.Sc. D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York City.

The following papers presented before the Twenty-fourth Annual Convention of the Illuminating Engineering Society, October, 1930:

MEASUREMENT OF BIOLOGICALLY IMPORTANT ULTRA-VIOLET RADIATION. By A. H. Taylor and L. L. Holladay.

THE PROBLEM OF THE DEFINITION AND MEASUREMENT OF THE USEFUL RADIATION OF ULTRAVIOLET LAMPS. By Clayton H. Sharp and William F. Little.

PHYSICAL CHARACTERISTICS OF SUNSHINE AND ITS SUBSTITUTES. By C. E. Greider and A. C. Downes.

A NEW SOURCE OF ULTRA-VIOLET RADIATION. By J. W. Marden and M. G. Nicholson.

LIGHT-REFLECTING PROPERTIES OF ACOUSTICAL MATERIALS

Most acoustical materials provide a soft yielding surface for the sound waves to strike, and many are constructed with minute or relatively large openings to trap the sound. In general, light is reflected best by surfaces relatively smooth and of light color. Proper painting will improve lighting conditions, but with certain forms of acoustical materials a coat of oil paint is likely to fill up the small openings and destroy the effectiveness. Some manufacturers recommend the use of kalsomine or water paints, and tests show that water paints deteriorate rapidly as regards their light-reflecting properties. When used they should be renewed at frequent intervals.

There is a need for materials with maximum sound-absorbing value, maximum light reflection with minimum depreciation without refinishing and at low cost. Reflection factors for invisible ultra-violet radiation should also be considered; attention is called to development of aluminum products for acoustical treatment and reflection of visible and biologically effective ultra-violet radiation. Wall covering woven of cellophane, wool and chenille for combined light-flection and sound-absorbtion has been used in Germany.

A tabulation of light-reflecting properties of 66 of the most common acoustical materials used in building construction is given in a recent research paper by A. L. Powell and C. L. Dows.* Reflection in per cent of visible light measured with a Taylor Reflectometer ranged from 8.3 to 75.6. The 33 products which reflected over 50 per cent are listed below.

*LIGHT REFLECTING FACTORS OF ACOUSTICAL MATERIALS. A paper by A. L. Powell and C. L. Dows presented before the Twenty-fourth Annual Convention of The Illuminating Engineering Society, 1930.

Trade Name	Manufacturer	Description	Reflection in per cent
Absorbege	M. C. Rosenblatt Co.	White finish	72.3
Absorbege	M. C. Rosenblatt Co.	Natural Color	64.5
Cushocel	M. C. Rosenblatt Co.	White finish	75.1
Acoustex	Boston Acoustical Eng. Div. of the Housing Co.	White	67.9
Acoustex	Boston Acoustical Eng. Div. of the Housing Co.	Cream	61.6
Acoustico	Ohio Hydrate & Supply Co.	White plaster, natural finish	75.6
Acoustolith	R. Guastavino Co.	White plaster	57.6
Acoustolith	R. Guastavino Co.	White stone	56.1
Ambler Absorbing Plaster	Keasbey & Mattison Co.	White plaster	59.4
Corkoustic	Armstrong Cork & Ins. Co.	White	66.0
Corkoustic	Armstrong Cork & Ins. Co.	Cream (Alabastine No. 26)	70.9
Corkoustic	Armstrong Cork & Ins. Co.	Tan (2—No. 26, 1—No. 48)	53.2
Corkoustic	Armstrong Cork & Ins. Co.	Tan (3—No. 26, 1—No. 48)	53.2
Dry-Zero	Dry-Zero Corporation	White	61.6
Insulite	Insulite Company	Light Cream	59.0
Macoustic	Macoustic Eng. Co.	Std. white, Fine pin stipple	53.8
Macoustic	Macoustic Eng. Co.	Std. white, Rough pin stipple	51.7
Macoustic	Macoustic Eng. Co.	Ivory white, Rice Root	56.1
Nashkote	Johns-Mansville	Felt, covered with perforated Kribble cloth, 3/16" holes	50.5
Nashkote	Johns-Manville, Inc.	Felt, covered with perforated Kribble cloth, 3/16" holes	57.6
Nashkote	Johns-Manville, Inc.	Felt, covered with perforated Kribble cloth, 1/8 holes	56.2
Felt	Johns-Manville, Inc.	Felt, covered with perforated Kribble cloth, 6/16 holes	55.4
Sanacoustic Tile	Johns-Manville, Inc.	Perforated white screen, brown cloth background	52.8
Rockwood Flexfelt (Gimco Products)	General Insulating & Mfg.	White cloth cover, metal screen	55.0
Sprayo-Flake	Sprayo-Flake Co.	White	53.5
U. S. G. Acoustical Tile	United States Gypsum Co.	Aluminum 1-coat, 20-oz. bronze, 6-oz. Duco, 2-oz. Thinner	57.6
U. S. G. Acoustical Tile	United States Gypsum Co.	Aluminum 2-coats, 20-oz. Bronze, 6 oz. Duco, 2 oz. Thinner	53.7
U. S. G. Acoustical Tile	United States Gypsum Co.	Gray Green, 1-coat, Devoe 1754 Paste, 50% Paste 50 1/8 Mineral spots	58.4
U. S. G. Acoustical Tile	United States Gypsum Co.	Gray Green, 2-coats, Devoe 1754 Paste, 50% Mineral spots	63.2
U. S. G. Acoustical Tile	United States Gypsum Co.	White, 1-coat, 2 pts. Acustolite, 1 pt. Mineral spots	63.8
U. S. G. Acoustical Tile	United States Gypsum Co.	White, 2 pts. Acustolite, 1 pt. Mineral sports	74.2
U. S. G. Acoustical Tile	United States Gypsum Co.	Plain tile, natural color	58.2
U. S. G. Acoustical Tile	United States Gypsum Co.	White-Natural color	53.5

Table VII.
Light Reflection Factors of Acoustical Materials

Körting and Mathiesen

Körting and Mathiesen

Desk lamps of lacquered metal. The design of the lamps determined by the purpose of lighting. Designed by Bauhaus Dessau.

LIGHTING CONTROL

The uses of photo-electric cells in conjunction with control systems for lighting installations have increased during the past year. Lighting control systems have been installed in schools and banks to turn artificial lights on and off automatically, depending on a predetermined daylight intensity. The price of one control unit installed is given as $75 by one manufacturer.

Thyratron tube units for mobile color lighting control have been installed in a number of theaters eliminating back stage switchboards and simplifying control. A "panic" control switch will turn on all the lights in the theater instantly.

A mercury tumbler switch for lighting installations has been announced by the Westinghouse Lamp Company. Absence of sparks and exposed contacts reduces fire-hazard. The operation is silent with slight mechanical wear and it handles heavy current.

NEW CODES, LIGHTING DATA, AND MINIMUM SPECIFICATIONS

CODE OF LIGHTING FACTORIES, MILLS, AND OTHER PLACES. American Standard, approved August 18, 1930, by American Standards Association. Prepared under the direction of and published by the Illuminating Society, New York.

Parts I and II of this code discuss the advantages of good illumination and describe the essentials of such illumination. Part III contains a set of regulations suggested for adoption by state authorities and recommended levels of illumination for industrial interiors.

LIGHTING THE HOME AND SCHOOL. A report of the Sub-Committee on Home and School of the Committee on Light and Safety. Illuminating Engineering Society, New York.

LIGHTING DATA SHEETS. Published under the auspices of the Committee on Lighting of the Illuminating Engineering Society, New York.

Treatment by example. New installations. Engineering data, photographs and charts. Published in data sheet form indexed for filing. Available by subscription.

MINIMUM SPECIFICATION FOR ADEQUATE WIRING OF LIGHTING CIRCUITS IN COMMERCIAL AND PUBLIC STRUCTURES. March, 1930.

MINIMUM SPECIFICATION FOR ADEQUATE WIRING OF LIGHTING CIRCUITS IN INDUSTRIAL STRUCTURES. July, 1931. Commercial National Section, National Electric Light Association, New York.

Future requirements must be considered. Capacities of electrical circuits at least 50 per cent greater than initial requirements are recommended.

ALL THE COMFORTS OF HOME. A series of articles prepared and published by Electrical Installation Record and assembled in pamphlet form by The Society for Electrical Development, Inc., New York.

RECENT PUBLICATIONS ON HOUSING

Reviewed by C. Theodore Larson

THE BUILDING OF SMALL DWELLINGS WITH REASONABLE RENTS. Compiled by Prof. Franz Schuster, Architect. Published by the International Housing Association, Frankfurt a. M., Hansa-Allee 27. 131 pp., illustrated. 6 marks ($1.50).

As an international inquiry into the housing problem, this publication has a large significance. It was prepared for use as the basis of discussion at the International Housing Congress held in Berlin this past summer. From the exchange of knowledge, it is hoped, will come later and more comprehensive studies of a subject on which the existing literature in most countries is very poor.

Seventeen countries—Belgium, Denmark, Germany, England, Finland, France, Holland, Italy, Latvia, Norway, Poland, Austria, Sweden, Switzeralnd, Czechoslovakia, U. S. A. and U. S. S. R.—are represented in the reports. (In the preface acknowledgment is made to James Ford, executive director of Better Homes in America, for the American contribution.) The reports not only outline the rising standards for dwellings but also make specific recommendations for lowering building costs.

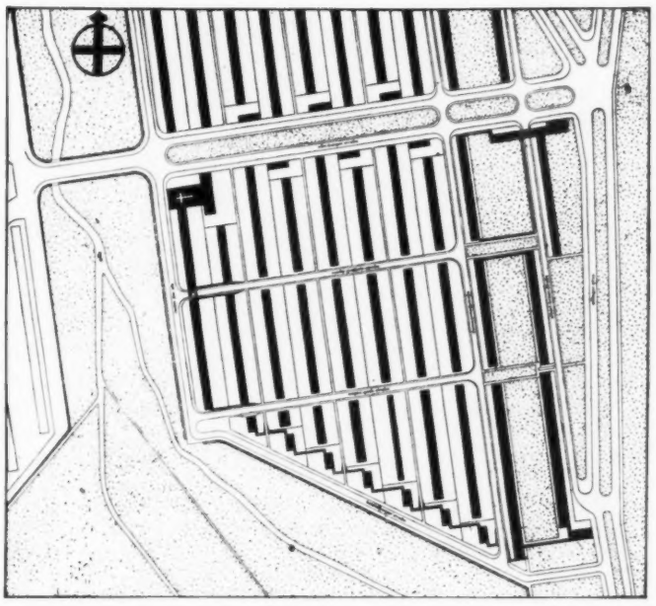
The book is well edited. The text is set forth in German, English and French in three parallel columns to the page. Following the reports are two large and excellent sections giving (1) group plans and (2) individual house plans of characteristic developments in each country. The plans are all drawn to the same scale.

PUBLIC UTILITY AND PRIVATE HOUSING ACTIVITY. By Dr. F. M. Wibaut of Amsterdam, president of the International Housing Association. Published by the Association, Frankfurt a. M., Hansa-Allee 27. 66 pp. 3 marks ($.75).

A companion volume to *The Building of Small Dwellings with Reasonable Rents*, this book also appears in three languages: German, English and French.

House building promotion by the state and local authorities—through abatement of rates and taxes, the granting of subsidies, and the provision of loans on favorable terms—is shown to have played an important part since the war. Only in Soviet Russia has the state itself built dwellings for general requirements; in other countries dwellings have been provided by the municipalities and by cooperative and housing societies.

According to many reports, the management which has proved best so far is the self-administration of colonies built by the cooperative societies. The influence of political groups and greater demands by the tenants themselves have been found obstacles in certain countries where the management is in the hands of local authorities.



From THE BUILDING OF SMALL DWELLINGS WITH REASONABLE RENTS.

Plot plan of the Colony Dammerstock near Karlsruhe, Germany. Built in 1929 by the town of Karlsruhe. Dwellings orientated for sunlight. Walter Gropius, architect.

Because of higher building costs and higher interest rates on mortgages, the rents of dwellings built by private capital without public support take a larger proportion of the income of wage-earners than before the war, it has been found. In some countries, even the housing developments aided by the government have not brought rentals within the reach of the working class. As a result, almost all of Dr. Wibaut's correspondents agree that private building enterprise is unable to provide the necessary dwelling accommodations for the masses at reasonable rents at the present time, except with the support of public means.

HOUSING POLICY IN EUROPE: CHEAP HOME BUILDING. Published by the International Labour Office, Geneva, 1930, and distributed in the United States by the World Peace Foundation, 40 Mt. Vernon Street, Boston. 378 pp. $1.25.

According to this League of Nations publication, the housing policy followed by the European governments since the war has been an unquestioned success. More than 600,000 dwellings have been erected by local authorities in Great Britain, some 700,000 by German local authorities and public utilities societies, more than 110,000 in the Nether-

lands, 60,000 in Austria and approximately 75,000 in Belgium. The erection of these dwellings with the assistance of the state, the general survey concludes, has in no small measure brought about social stability.

The book calls attention to the efforts made by various governments to encourage experiments directed towards the reform of building methods and a rationalization of the building industry in general, a task which is likely to extend over a number of years and of which the effects will be apparent only in the future.

Admirably complete studies are made of the post-war building difficulties in various countries. The forms of government and local assistance, exemption from taxation, land policies and the reduction of building costs are described.

APARTMENT HOUSE INCREASES AND ATTITUDES TOWARD HOME OWNERSHIP. By Coleman Woodbury. An article in The Journal of Land and Public Utility Economics, August 1931, pp. 291-327. Published quarterly by The Institute for Economic Research, 327 E. Chicago Ave., Chicago. $1.25.

In the eight years from 1921 to 1928 the number of families provided for in multi-family dwellings in 255 cities in the United States increased from 24.4 per cent to 53.7 per cent. During the same period the number of families provided for in single-family dwellings decreased from 58.2 per cent to 35.2 per cent; and in two-family dwellings, from 17.4 per cent to 11.1 per cent.

This trend toward the apartment house in America—a phenomenon frequently commented on in the European publications on housing—is the subject of Mr. Woodbury's economic analysis.

The usual explanations of lower costs, rapid population growth and the post-war housing shortage are unsatisfactory, he finds, in the face of contradictory facts. The movement increased rather than decreased in momentum during these years. Cities with the high indexes of community wealth and income generally have had the higher apartment house increases, so the movement is not entirely a matter of economy.

The study of statistics suggests instead that the clue to an understanding of the apartment trend may be in part in the attitude of people toward the comparative merits of home ownership as an investment and the desirability, or at least, the acceptableness of apartment-house living.

Answers to a questionnaire sent to various income classes in the Chicago region indicated varying attitudes. Considerations both of cost and of investment strength of ownership decrease in importance in the higher income classes. On the other hand, non-pecuniary considerations, it was found, do not seem to be of as great weight as the cost and investment reasons; indeed, some of them—welfare of children, play space, quiet—seem to oppose the increase in apartment building, and forecast a change in the standards of air, light and space in residential districts.

NEIGHBORHOODS OF SMALL HOMES: Economic Density of Low-Cost Housing in America and England. By Robert Whitten and Thomas Adams. Published by the Harvard University Press, Cambridge, Mass. 1931. 205 pp., illustrated. $3.50.

This volume, the third in the series of the Harvard City Planning Studies, embodies the results of a research into less extensive uses on low-cost land in contrast to the previous volume, *Building Height, Bulk and Form*, by George B. Ford, which is devoted to studies of the more intensive uses on high-cost land.

The book is divided into two parts, the first dealing with the economic density of low-cost housing in America, and the second with low-cost housing in England. In both cases the study was made to determine how thinly the population may be spread and still meet the cost of complete city improvements and adequate housing.

In other words, what effects have lot size, open space, and block and street layouts on the cost of the home?

The chief conclusion reached in the survey is that the assumption that the cost of the lot for the small house can be reduced by decreasing its size does not hold true. Small lots do not necessarily mean cheaper houses. An increase in the density of housing means an increase in the value of the raw land. The trend toward higher housing densities should be resisted. With normal densities (5 to 6.5 houses to the acre) it is entirely feasible by careful planning, the book states, to provide ample play space and other desirable community features without increasing land costs. If the density is increased to 8 houses to the acre, at least 20 per cent of the gross area should be set aside for play-park purposes.

Another finding of the survey shows that the expenditure for rent or housing will average 18 per cent of the family income. Annual rentals, it is estimated, will average one tenth of the investment in housing. A large number of valuable tables, plans, topographical diagrams and cost data are included in the appendix.

THE HOME AND THE CHILD. A Publication of the White House Conference on Child Health and Protection. Published by the Century Co., 353 Fourth Avenue, New York City. 1931. 165 pp. $2.

Although this book is written primarily from the point of view of the social worker and home economist, it offers much of interest to the architectural profession. In addition to the chapters on home furnishings, management, income and the child's clothing, a number of specific recommendations are made in an effort to set up housing standards.

These housing standards are treated in four divisions: the neighborhood, the house lot, the house exterior and the house interior. Neighborhood play spaces for children and ample sunlight for all rooms are among the recommendations.

REPORT OF THE NEW YORK STATE BOARD OF HOUSING, 1931. Copies may be obtained from the State Board of Housing, Albany, New York. 72 pp.

This report describes housing projects which have been erected under the New York State Housing Law providing tax exemption on buildings offering rentals of $12.50 or less a month per room in Manhattan and $11 a month per room elsewhere in the state.

During the first two years in the administration of this law the Housing Board was unable to induce commercial builders to take advantage of the terms. The success of early projects financed by cooperative organizations has shown that a conservative return can be secured from an investment serving the public good. The Academy Housing Corporation project, the largest single housing group so far undertaken, is now under construction on a site in the Bronx overlooking the East River; it is financed by commercial operators.

Complete financial set-ups, rental schedules and operating charges are given for several projects completed in 1930. (One of these, the Amalgamated Housing Corporation apartments, was illustrated in the apartment house issue of THE ARCHITECTURAL RECORD, March, 1931.)

Other sections of the report cover a study of the standards of living of 400 families in the Amalgamated Housing Corporation development; maintenance cost of low-cost housing projects; and a very valuable series of tables showing the relation of rents to land prices, land coverages, construction costs and room sizes.

COST OF LIVING STUDIES. Compiled by the Heller Committee for Research in Social Economics at the University of California. Published by the University of California Press, Berkeley, Calif. (I) Quantity and Cost Estimate of the Standard of Living of the Professional Class. 41 pp. 40c. (II) How Workers Spend a Living Wage. 85 pp. $1.25. (III) The Food of Twelve Families of the Professional Class. 47 pp. 60c. (IV) Spending Wage of a Semi-Skilled Group. 71 pp. 90c.

Few studies of family expenditures have been made by economists, except by Thorstein Veblen and by the U. S. Bureau of Labor Statistics survey in 1918-1919. Consequently, these studies by the Heller Committee are significant. Even though the recent fall in commodity prices has no doubt affected the figures given in the tables, much value can be attached to the percentages for the various expenditures of families in the various income classes.

The results of these studies are presented not as a theory of ideal expenditures, but as an analysis of customary spending habits. The expenditures for housing in the professional class, it was found, averaged 20.7 per cent (mean average) and for house operation 15.3 per cent. In the case of typographers' families in San Francisco, with average incomes of $2,600 a year, the expenditure for housing was 15.3 per cent and for house operation 9.0 per cent. For families of motormen, conductors, brakemen and bus drivers in the San Francisco area, with incomes averaging between $1,600 and $2,000 a year, the expenditure for housing was 17.9 per cent and for house operation 7.0 per cent.

REPORT ON THE CAUSES OF CRIME. National Commission on Law Observance and Enforcement. U. S. Government Printing Office, Washington: 1931. For sale by the Superintendent of Documents, Washington, D. C. Vol. I, 390 pp., 80 cents. Vol. II, 401 pp. 85 cents.

This report of the Wickersham committee emphasizes the inconclusiveness of existing evidence that there is a causal relationship between bad housing and crime. On the contrary, the families of delinquents are to be found in all social and economic strata, and the proportion of delinquency in the lowest strata is not very much greater than what might be expected from their representation in the general population.

An important conclusion reached by the investigators, however, is that the unit of approach to law observance appears to be *the local community and its social program.* The influences affecting the conduct of the individual—*housing, family life, neighborhood life, schools, opportunities for employment, and modes of recreation*—are all recognized as phases of life over which the community can exert a definite control.

Volume II describes the characteristics of delinquency areas, a study based on investigations in Chicago and six other cities, and on Professor Burgess' theory* that the modern American city tends to take the form of five concentric urban zones. These areas are: (1) the central business district; (2) the zone in transition, the deteriorated residential section with its encroachments of business and industry; (3) the zone of independent workingmen's home, characterized by two-flat dwellings; (4) the zone of better residences; and (5) the commuters' zone.

The greatest concentration and highest rates of delinquency occur in the areas adjacent to the central business district and the large industrial developments. Housing conditions are probably more undesirable here, the report states, than in any area of the city.

Highest rates and concentration of delinquency are also to be found in those sections of the city which show a decreasing population. Likewise, the areas of increasing population show comparatively lower rates.

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* THE CITY. By R. E. Park, E. W. Burgess et al. The University of Chicago Press: 1925.
URBAN AREAS IN CHICAGO: An Experiment in Social Science Research. By E. W. Burgess. Edited by T. W. Smith and L. D. White. University of Chicago Press: 1929.
See also THE COUNTRY HOUSE. An article by A. Lawrence Kocher in THE ARCHITECTURAL RECORD; November, 1927.

NEWS IN BRIEF

CREATING WORK IN MUNCIE

A simple scheme of inducing the public to begin small or large repair jobs in their own homes has been found exceedingly effective in Muncie, Indiana, in stimulating building activity and relieving the unemployment situation. What Muncie is doing is suggested for other cities by *Printers' Ink*, a journal for advertisers, in recent issues of which the scheme has been reported in detail.

The plan began with a group of donors who advertised the suggestion that business be put back to work. The appeal was for renovations—anything from painting a house, adding a bathroom or just putting in a new pane of glass.

The first advertisement appeared on a Sunday; contractors began to receive telephone calls early Monday morning, and by noon a dozen new jobs were under way. Other advertisements followed and by the end of the second week one hundred and fifteen jobs were under way and more than three hundred men had been put to work.

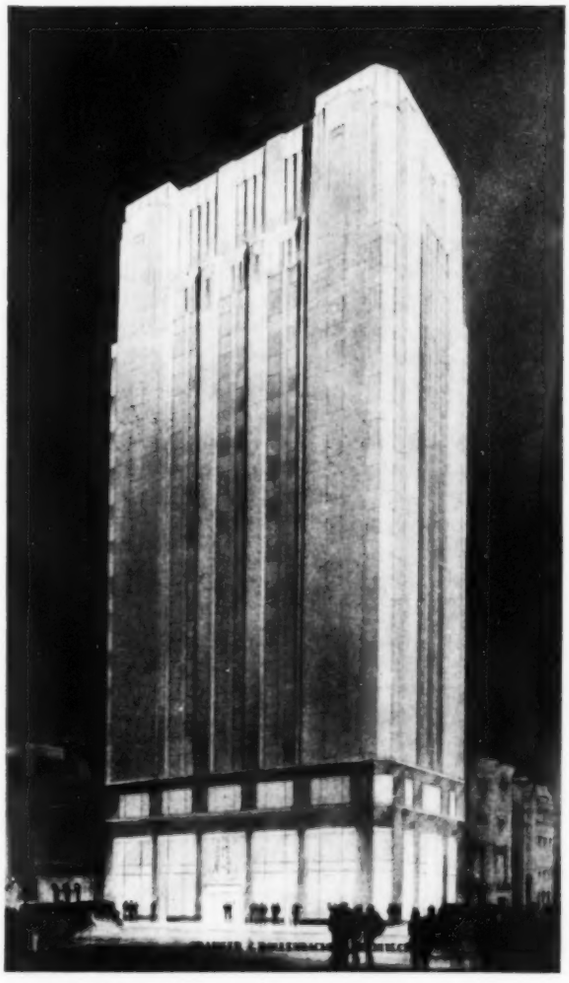
Improvements which had been made were photographed and made the basis for more full-page advertisements. For each $25 subscribed by a donor a membership was awarded by the Chamber of Commerce. For expenditures of only a little more that $1,000 it is estimated that $250,000 worth of improvements were started in sixty days.

Future plans of the Committee call for a continuation of paid advertising and a series of broadcasts over the local radio station. Letters will be sent to a list of one thousand property owners whose properties, in the opinion of the Committee, should be modernized and who, it is supposed, have available funds. No attempt is being made by the sponsors of the Muncie Plan to start new building. The modernizing campaign calls only for general remodeling and necessary repairs.

The idea is not only growing in Muncie; it is taking hold in other cities, according to *Printers' Ink*. A similar plan has been adopted by Des Moines.

ALUMINUM TISSUE AS HEAT INSULATOR

A tissue-thin wrapping of aluminum foil, it has been found by tests at the Pennsylvania State College, insulates steam pipes as thoroughly as an inch of ordinary covering. Four experimental steam pipes in the mechanical laboratory were studied under the direction of Prof. F. C. Stewart, and the heat loss was found to be reduced by 25 per cent.



A COOPERATIVE OFFICE BUILDING

Plans have been completed by Granger and Bollenbacher, architects, for a 17-story cooperative office building on Michigan Avenue, in which each tenant will own his office space. Every fourth floor is reserved for future expansion. This building is the first of its type to appear in Chicago. It is already 60 per cent rented.

NOT TOO MANY HOUSES, REALTY REPORT SHOWS

Few representative American cities are overbuilt, either with apartment structures or single-family residences, according to the seventeenth semi-annual survey of the real estate market by the National Association of Real Estate Boards.

Covering 381 cities located throughout the country, the study presents the supply and demand situation in buildings of all types, rent trends, and analyses of the present status of the real estate market and of the real estate money market.

The figures reveal that in 72 per cent of the cities reporting the demand for single-family residences just about equals the supply; 17 per cent

report an actual shortage, and only 11 per cent have an oversupply.

Sixty-five per cent of the cities report no oversupply of apartment structures; 12 per cent have a shortage; and only 23 per cent have too many multi-family dwellings.

Sixty-six per cent of the cities report no oversupply of business space; 2 per cent have a shortage in this type of building; and 34 per cent turned in an oversupply.

UNIFICATION OF THE ARCHITECTURAL PROFESSION

Declaring that civilization is now going through a crisis threatening the survival of architecture as a profession, the American Institute of Architects has announced plans to unify the architects of the nation under the leadership of the Institute.

There are now more than 30,000 persons in the United States who have been trained in architecture, and who are enrolled chiefly in independent societies, it was said by Frank C. Baldwin of Washington, secretary of the Institute, in making public the report of two Unification Committees headed by Edwin Bergstrom of Los Angeles, representing the Institute, and Robert H. Orr of Los Angeles, acting for the state societies.

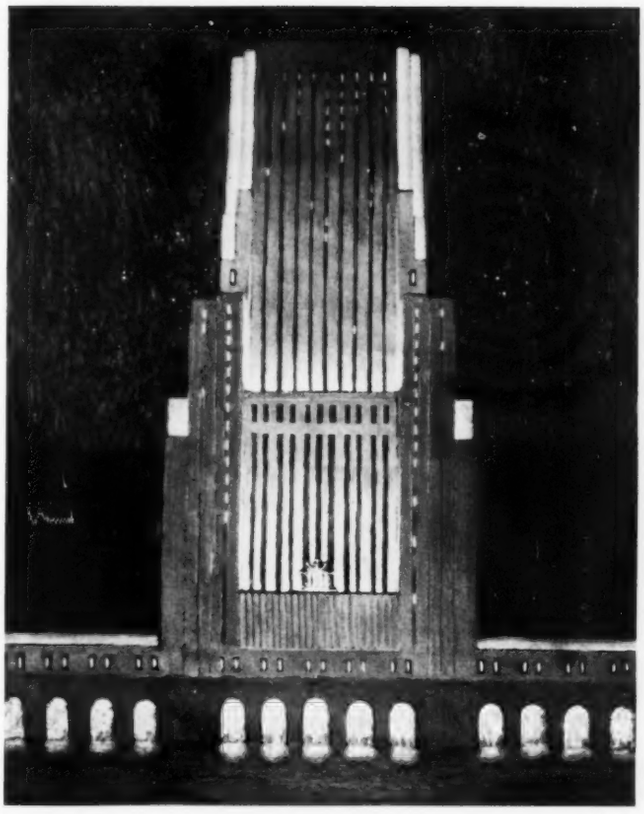
The report strongly recommended unification, saying that state-wide organizations of architects should be incorporated in every state with local branches, and should work with the chapters of the Institute, which should be the sole national organization of architects. Formation of architectural clubs and of student clubs was also urged.

There are active state organizations of architects in New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Washington, California, New Jersey and Florida.

Enduring standards of American architecture, and the enlistment of private architects in Federal building projects to avoid "stereotyped forms" were cited as major objectives of the architects. Effective cooperation with the building industry is another aim. In New York City, it was said, the architects are a moving force in the operation of a Building Congress which comprises 3,400 men in the building industry, of whom 2,300 are honorary craftsmen members.

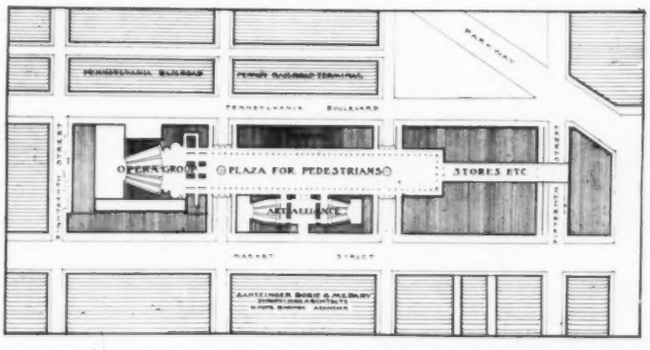
In addition to Chairman Bergstrom, other members of the Unification Committee for the Institute are: Charles Butler, New York City; Frederick W. Garber, Cincinnati; Louis LaBeaume, St. Louis; Frederick H. Meyer, San Francisco.

The Unification Committee for the State Societies, besides Chairman Orr, is composed of: Tirrell J. Ferrenz, Chicago; Merritt Harrison, Indianapolis; Frederick Mathesius, Jr., New York City; Walter R. McCormack, Cleveland; Lancelot Sukert, Detroit; R. M. Trimble, Pittsburgh.



PROPOSED BUILDING
FOR THE PHILADELPHIA ART ALLIANCE

W. Pope Barney, Architect
Zantzinger, Borie and Medary, Associated



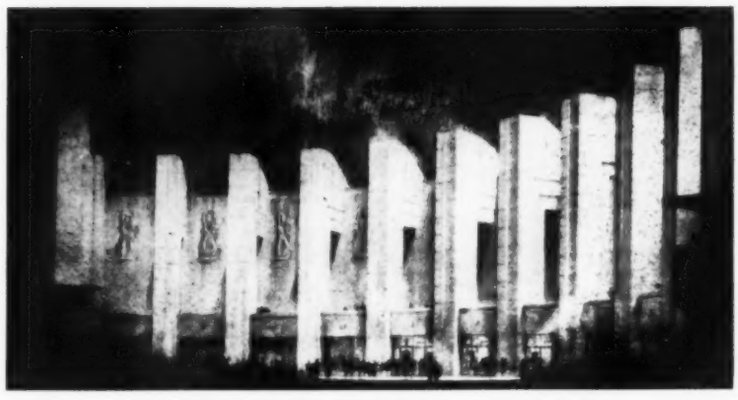
A CIVIC AND SHOPPING CENTER PROPOSED FOR PHILADELPHIA

A comprehensive development of three city blocks has been under study for the past year by Zantzinger, Borie and Medary, architects, and W. Pope Barney, associated architect. As a shopping area, the scheme provides parking facilities for the cars of patrons and a large number of shops, stores, offices, banks and places of amusement and refreshment. Separate levels are provided for moving vehicles, parked cars and pedestrian traffic. The central tower of the Art Alliance will have an outdoor organ for the enjoyment of audiences in the plaza.

HALL OF SCIENCE—Chicago, 1933

Construction of the fourth Chicago 1933 World's Fair building has begun. Designed by Paul P. Cret, Philadelphia architect, the structure will be in metal and glass, rising from colored terraces, and brilliantly illuminated.

The building will be 700 by 400 feet, two stories and a mezzanine in height, and will probably house the basic and medical science exhibits.



MORE ON LIGHTING THE CLASSROOM*

Generally stated, our requirements for classroom window lighting are that it shall be from one side of the room only and that at the left of the pupils when seated; the windows shall be so placed in the plan that there shall be a minimum distance from the forward left hand corner of the room to the first window of 4 feet (6 feet is more desirable); the window glass area shall equal one-fifth of the floor area of the room; the top glass line of the windows shall be at a height above the floor equal to one-half of the width of the room; and the space between window units where masonry piers are required or desired shall not exceed 26 inches from glass to glass.

In respect to artificial lighting by electricity, our requirements are that there shall be a good general illumination and that the classroom fixtures shall be of a wholly inclosed type to reduce and prevent eye strain and glare. There shall be provided also at or near the rear wall of each room a wall outlet to be used for stereopticon service. In the standard classroom unit having the approximate dimensions of 22 feet by 30 feet by 12 feet in height we accept an electric fixture plan in which there are four ceiling fixtures, each located in the approximate center of the quarter section of the room. We believe, however, that six fixtures in two rows will provide better distribution of light.

GEORGE D. COONS, Consulting Architect,
The State Education Department, New York.

*LIGHTING THE CLASSROOM, by H. L. Logan, pages 54 and 55, July issue.

CHICAGO WORLD'S FAIR

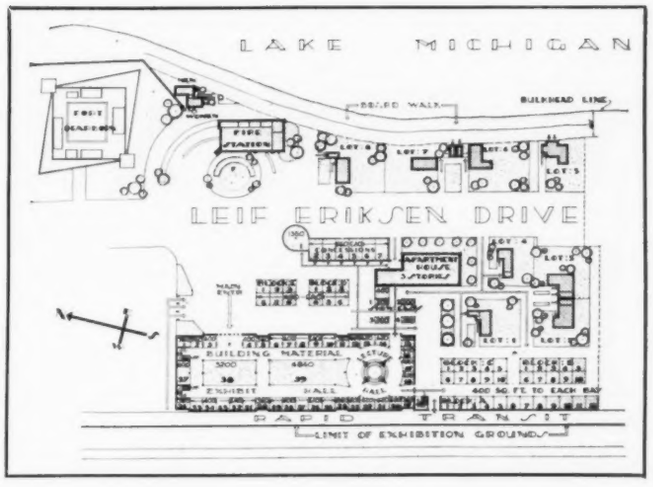
A housing exhibit is now being planned by A Century of Progress Exposition as part of the Chicago 1933 World's Fair. Five acres of ground have been set aside for this housing exhibit.

The housing exhibit will contain eight residences, an apartment building, an exhibit hall, garages, and a model fire station. The ground surrounding the buildings will be landscaped to provide lawns, parks and garden spaces.

The exhibit, as it is now planned, will demonstrate as many different types of housing conditions, with the current solution for each as it is possible to show within the allotted space—urban, suburban and semi-rural.

Double housing or continuous row housing will be demonstrated. This construction method, which provides merely a party wall between individual houses, is regarded as one of the solutions to the problem of moderate-priced housing.

Each residence will be furnished with a garage. The lots on which these residences lie will be about 90 by 120 feet.



NO SPEED LIMIT FOR ELEVATORS

The elimination of all speed limits for passenger elevators is one of the features of the new national safety code for elevators announced by the American Standards Association. Approval of the code by the Association followed nearly four years of research on elevator safety devices at the United States Bureau of Standards and extensive investigation by a technical committee composed of 38 representatives of architectural, engineering, governmental and other organizations.

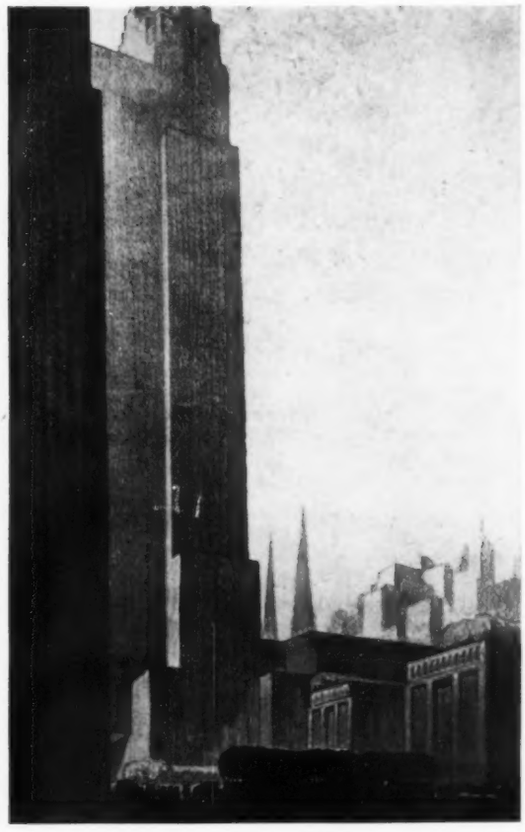
For the first time, the national elevator code permits the operation of more than one elevator in a single shaft, thus removing one of the obstacles to the erection of skyscrapers—the excessive space required for elevators. The code provides rigid safeguards to eliminate any possibility of collision between two elevators in the same shaft. The code also provides for two-story cars which consist of two separate cages, one above the other, to serve two floors simultaneously from the same shaft. These will not be "one-man cars," however, an operator for each of the two cages being required by the code. Safety devices will prevent the two-story car from moving until the safety gates of both cages are closed.

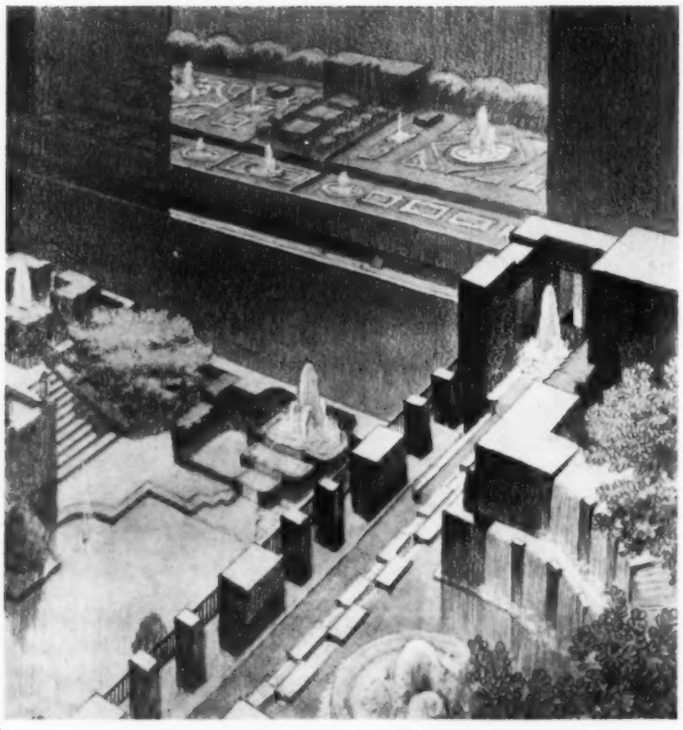
Further provision is made for a new type of express-local system in which the master express elevator will stop at only three or four express or plaza floors—ten, fifteen, or even more stops apart—at which points passengers will transfer to local elevators starting from the plaza floors rather than all from the first floor, the present practice in skyscrapers.

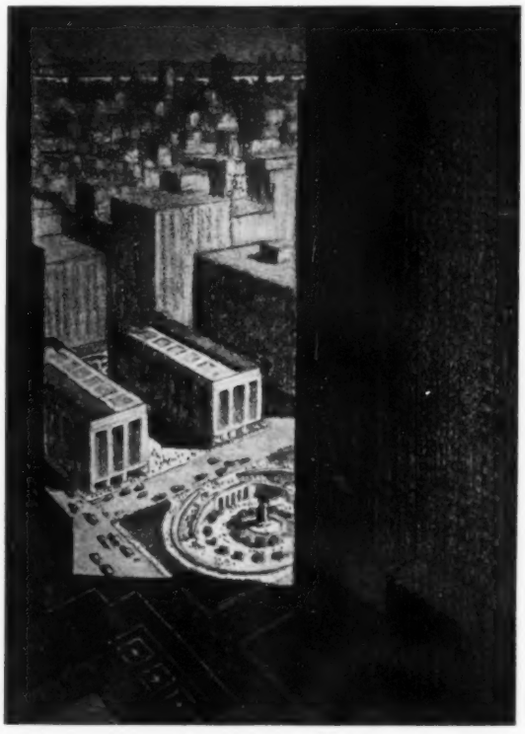
ROOF TERRACE FOR CONVALESCENTS

New York Polyclinic Medical School and Hospital

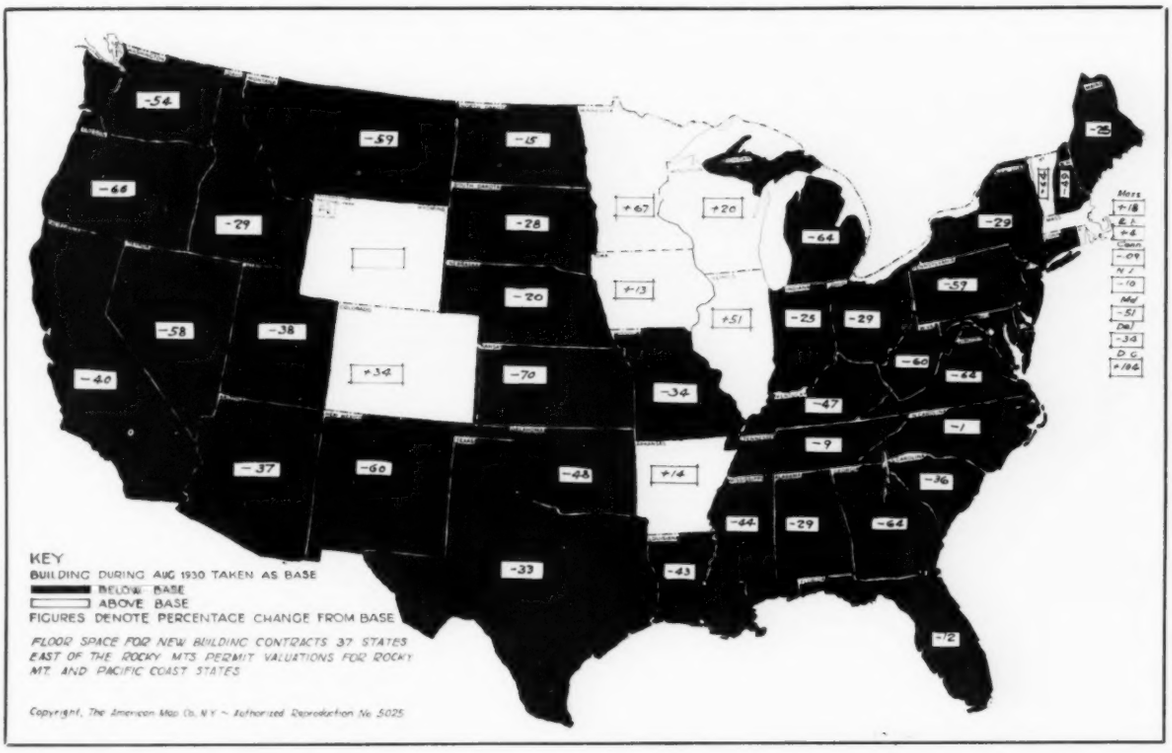
The roof overlooks the Hudson river. The marine atmosphere, according to A. A. Jaller, executive officer of the hospital, has demonstrated its value to convalescents. A deck steward is available to make the patients comfortable in the steamer chairs. Games are played and afternoon tea is served daily to the patients and their guests.







HANGING GARDENS OF RADIO CITY—The roof terraces of the $250,000,000 amusement center now being built by John D. Rockefeller, Jr., and the Metropolitan Square Corporation in New York City will be landscaped with pools, fountains, tiled paths, flower mosaics, trees and shrubs. The architects are Reinhard and Hofmeister; Corbett, Harrison and MacMurray; Raymond Hood and Fouilhoux. The project was described in the April issue.


KEY
BUILDING DURING AUG 1930 TAKEN AS BASE
BELOW BASE
ABOVE BASE
FIGURES DENOTE PERCENTAGE CHANGE FROM BASE
FLOOR SPACE FOR NEW BUILDING CONTRACTS 37 STATES EAST OF THE ROCKY MTS PERMIT VALUATIONS FOR ROCKY MT. AND PACIFIC COAST STATES
Copyright, The American Map Co. N.Y. ~ Authorized Reproduction No. 5025

The August building map showed nine states east of the Rocky Mountains where new contracts, on a floor-space basis, were larger than those reported for August, 1930: Vermont, Massachusetts, Rhode Island, District of Columbia, Illinois, Iowa, Wisconsin, Minnesota and Arkansas. In addition, Connecticut and North Carolina, on the same basis, showed only unimportant losses from a year ago.

BUILDING TRENDS INDICATED BY THE FEDERAL CENSUS—PART 4

By L. Seth Schnitman

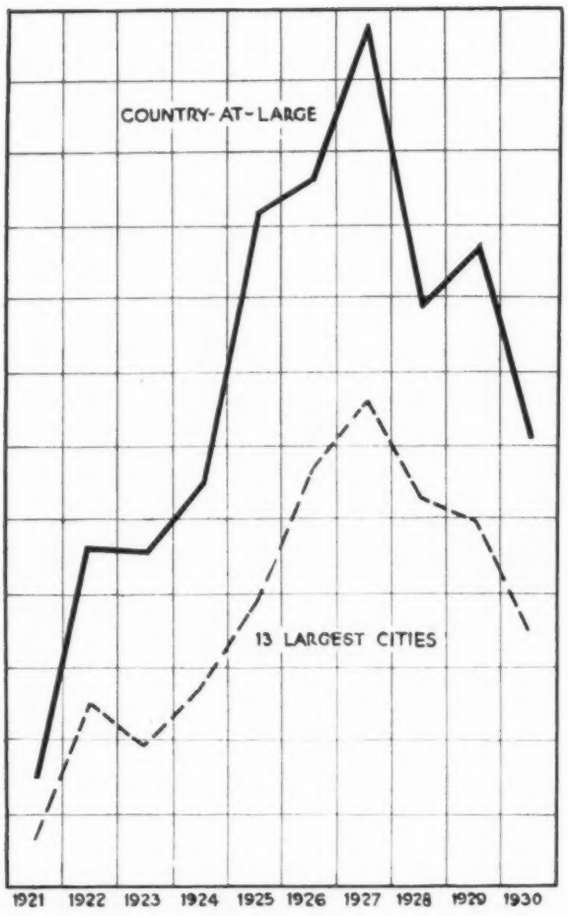
OFFICE BUILDING CONSTRUCTION

The office buildings erected during the past decade, perhaps more truly than any other building type, will serve, for years to come, to characterize the kaleidoscopic economic changes that took place during the ten-year period, 1921-1930. In that short span the production of new commercial office facilities in the United States reached the huge sum of $3,850,000,000. During the same period new residential facilities showed a production value of $24,600,000,000. Thus, for each $5,000 expended on new residential construction, practically $800 was spent on the erection of new office space to care for the needs of an expanding commercial and professional world.

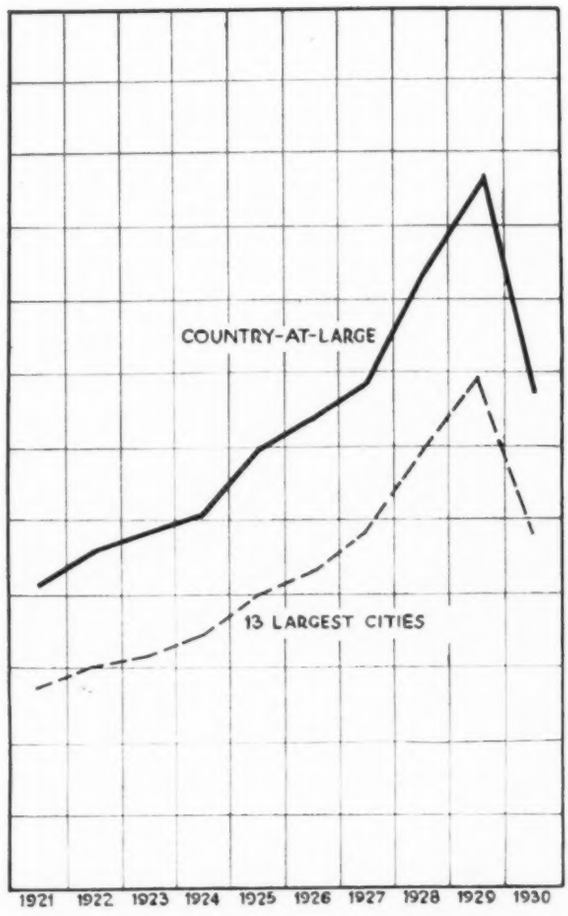
Business Growth and Office Space

What was the change in our volume of commerce during that decade which necessitated an average annual rate of $385,000,000 in expenditures for office construction? Using check payments as a yardstick, it is found that the rise between the depression year, 1921, and the peak in 1929, disregarding the effects of price changes during the interval, approximated 130 per cent. At the same time the advance in new office building expenditures approximated 660 per cent between 1921 and the peak of the cycle, in this instance, the year 1927.

The large increase in office building construction from 1921 to 1927 came about fully as much because of genuine demand for space as because of any other single factor or combination of factors. This was the period of reconstruction after the war, when virtually all building of this type had been at a standstill; these were the years of readjustment of earning power to advancing land values and rising taxes. Then, too, the release of



Trend of new office construction: 1921-1930
For the 13 largest cities the decline in 1930 from the 1927 peak amounted to less than 50 per cent, while the rise from 1921 to the peak amounted to about 900 per cent. The 1930 level was five times as high as that for 1921.



Trend of check payments: 1921-1930
For the 13 largest cities the decline in 1930 from the 1929 peak amounted to 32 per cent, while the rise from 1921 to the peak amounted to about 150 per cent. The 1930 level was somewhat less than twice that for 1921.

factory workers to non-industrial occupations, incident to technologic advances, proceeded apace, and a large absorption of workers into commercial, financial, and professional pursuits took place. This was the period when our schools and colleges released more "white collar" graduates than in any similar period in our history. This was the dawn of an era of scientific study of the problems of distribution and the coincidental rise in services of every description to cope with these problems. This was the period when the dentist and the physician forsook the home as the place of his practice for the more conveniently located office building. These factors, to say nothing of the insistent demand for modern and ultra-modern facilities, to a greater or less extent, were forces that brought about the rapid and almost spectacular advance in new office construction.

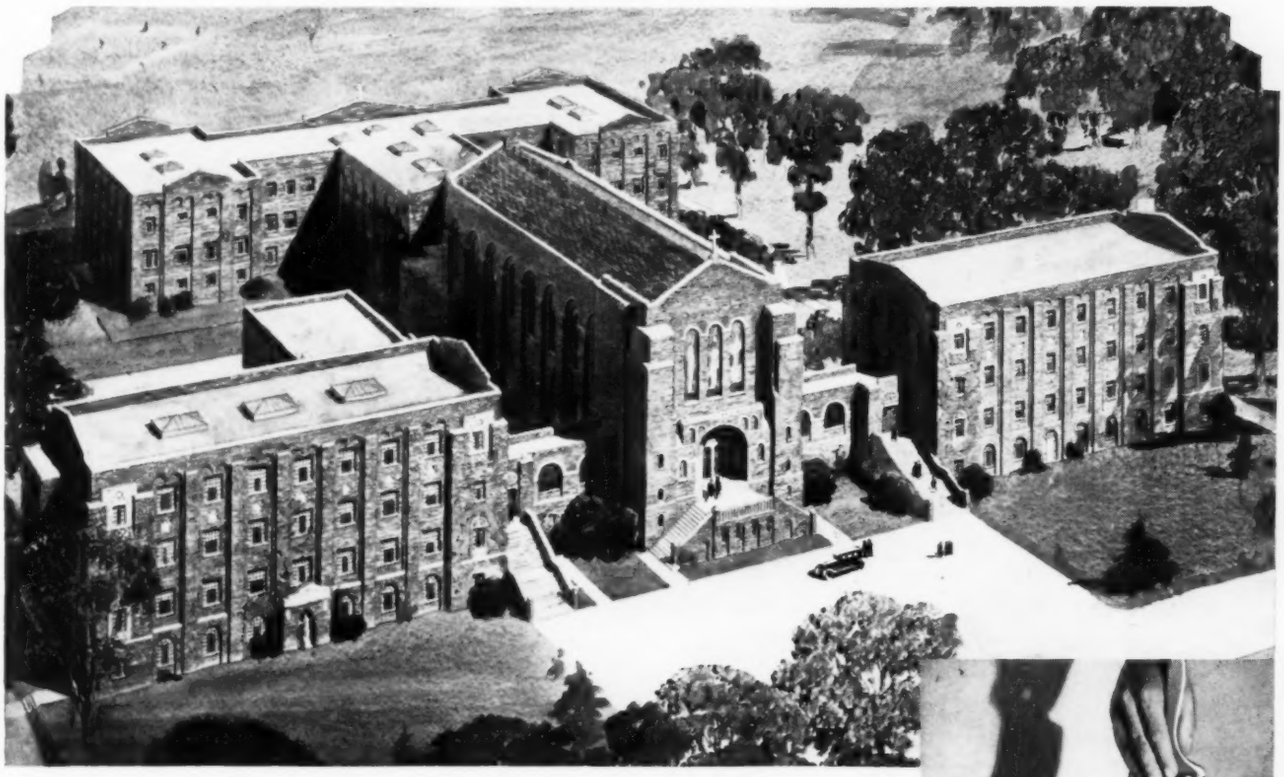
Concentration of Buildings in Largest Cities

About 53 per cent of new office building construction during the decade was concentrated in our 13 largest cities, *i.e.*, those having 500,000 or more inhabitants, according to the 1930 census; these are the cities whose combined population was only 17 per cent of the entire population of continental United States or only 30 per cent of the total urban population of the country. For these same 13 centers commercial transactions, as measured by the volume of check payments over the decade, represented approximately 65 per cent of the entire money turnover of the country. These cities are our most important commercial centers and as such must continue to provide the facilities underlying our entire complex financial and speculative structure.

These are the cities where present disturbed business conditions are for the most part particularly pronounced, where office vacancies are abnormal, where mortgage bond defaults and real estate foreclosures are heaviest. For these reasons it is seriously doubted that the next wave of office-building construction will be so largely concentrated in our greatest cities as in the past, although when more normal conditions are restored these

(Continued on page 54, advertising section)

. . and Interiors, too . . are *lastingly beautiful*



St. Joseph's Normal Institute, Barrytown, N. Y. Architect—James W. O'Connor Associate Architects, James F. Delany, Paul Schulz.

THE buildings of St. Joseph's Normal Institute at Barrytown, New York—both in their exterior construction and their interior finish—have been endowed to a remarkable degree with *lasting* beauty and charm.

Painted surfaces within the buildings were done with Barreled Sunlight . . . the smooth, flawless paint enamel that can't hold dirt embedded. Finger prints . . . smudges . . . dust . . . may easily be wiped off with a damp cloth.

And Barreled Sunlight retains its soft depth—handsome cleanliness—after repeated washings. Its extreme durability reduces the necessity for frequent repainting.

An all-oil product, Barreled Sunlight is easily tinted in soft pleasant colors appropriate to the harmonious needs of any room.

Our catalogue is in Sweets, but for your own files let us send you the new booklet, "For Interiors of Lasting Beauty and Cleanliness." Write to U. S. Gutta Percha Paint Co., 22-J Dudley Street, Providence, R. I. Branches or distributors in all principal cities. (For Pacific Coast, W. P. Fuller & Co.)

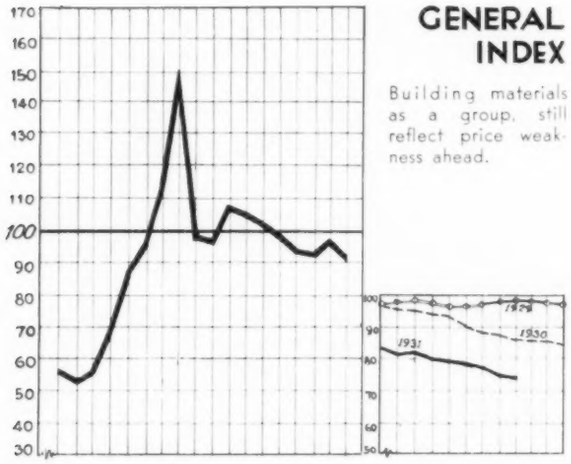
BARRELED SUNLIGHT is available in two forms, Interior and Outside. Write for complete information on Outside Barreled Sunlight—its pronounced whiteness, richer lustre, marked durability.

Barreled Sunlight

Reg. U. S. Pat. Off.

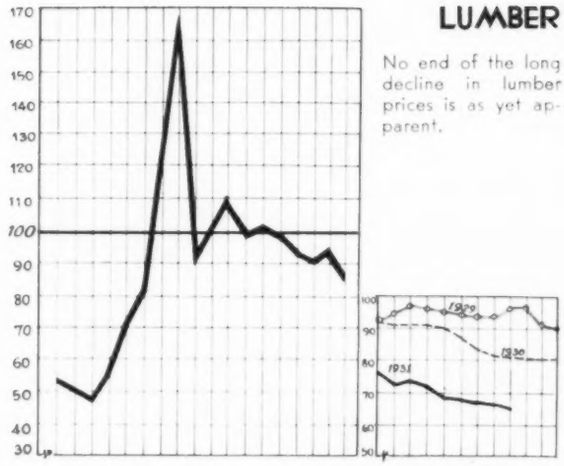
WHOLESALE PRICES FOR BUILDING MATERIALS

1926 Monthly Average—100



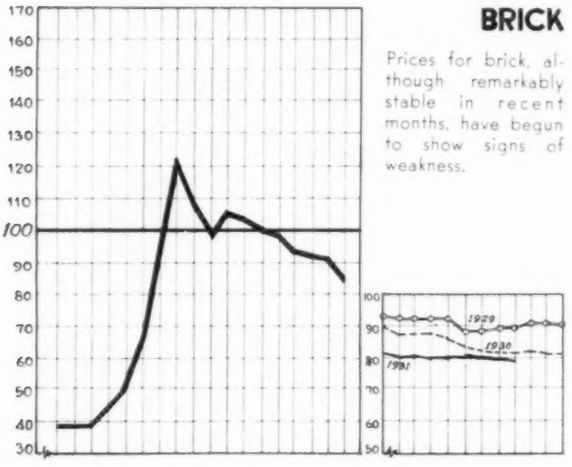
GENERAL INDEX

Building materials as a group, still reflect price weakness ahead.



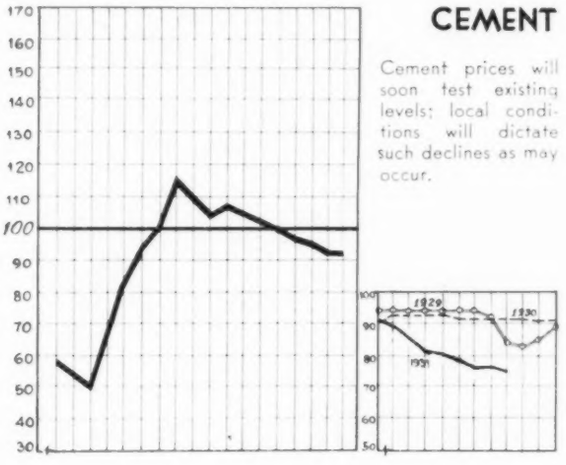
LUMBER

No end of the long decline in lumber prices is as yet apparent.



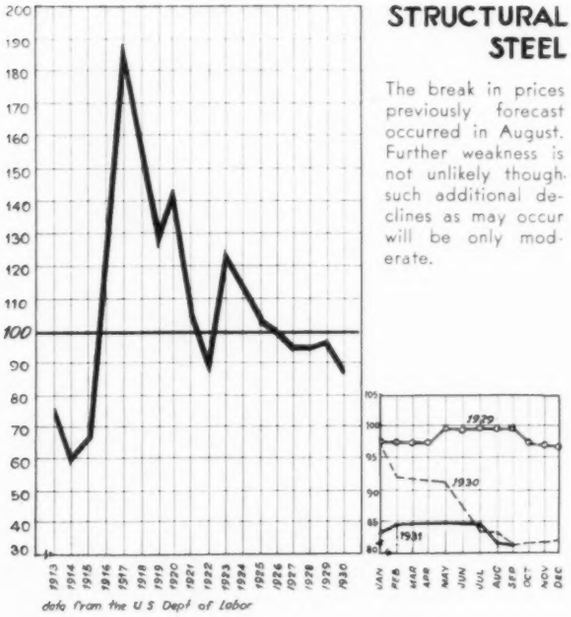
BRICK

Prices for brick, although remarkably stable in recent months, have begun to show signs of weakness.



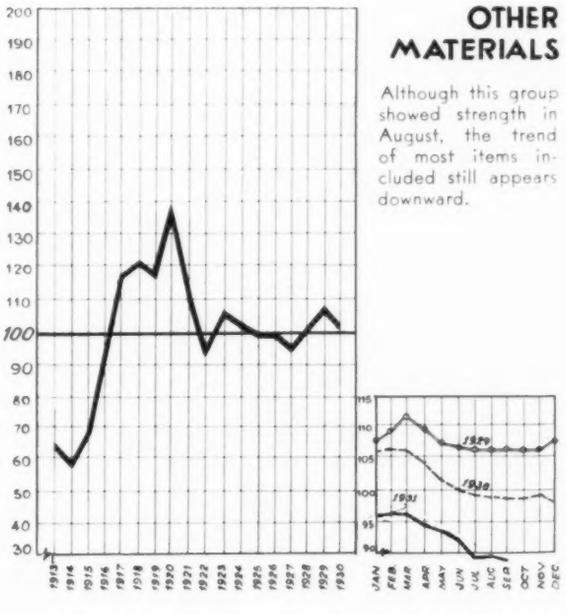
CEMENT

Cement prices will soon test existing levels; local conditions will dictate such declines as may occur.



STRUCTURAL STEEL

The break in prices previously forecast occurred in August. Further weakness is not unlikely though such additional declines as may occur will be only moderate.

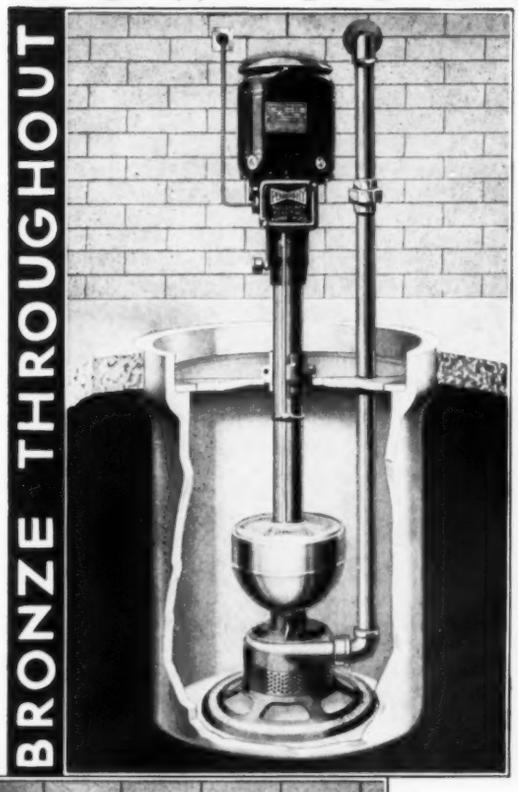


OTHER MATERIALS

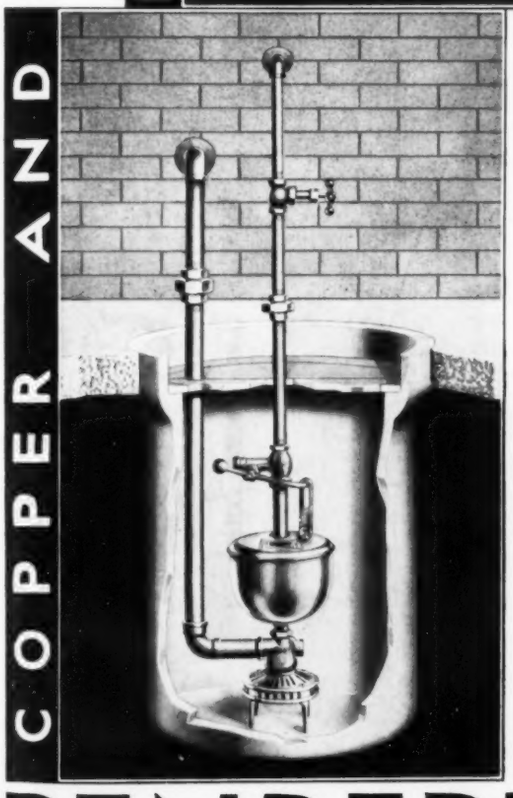
Although this group showed strength in August, the trend of most items included still appears downward.

data from the U S Dept of Labor

A few reasons why— many Architects specify..



TRADE PENBERTHY PRODUCTS MARK



TO dispose of seepage below sewer level—or where sewerage facilities are not available—many architects prefer one of the units illustrated here. Local conditions determine whether the electric or hydraulic unit will be most economical—but both pumps have many characteristics that appeal to the architect.

Both the Penberthy Automatic Electric Sump Pump and the Penberthy Automatic Hydraulic Cellar Drainer are immune to corrosion—they are copper and bronze throughout. Both are thoroughly dependable under the most severe operating conditions, and are economical of electricity and water power. They are fool-proof, require no kid-glove handling, and are easy to install.

Manufacturing a complete line of both electric and hydraulic units in a full range of types and sizes, the Penberthy organization is especially well qualified to recommend the correct equipment for any specific case. Leading jobbers throughout the country stock both electric and hydraulic units.

PENBERTHY INJECTOR COMPANY
Established in 1886 — DETROIT — Canadian Plant Windsor, Ont.

PENBERTHY PUMPS REMOVE SEEPAGE WATER

(Continued from page 312, Editorial Section)
cities, doubtless, as heretofore will first manifest recovery.

Influence of Population Increases

Population growth in our largest centers over the next decade will probably show relatively smaller expansion than appears indicated for the remaining urban centers; at least that is the inference to be drawn from the population changes that took place between 1920 and 1930. Where our urban population as a whole showed an expansion between the two census years of 26.9 per cent, our thirteen largest cities showed a growth of only 23.8 per cent. The professions are becoming increasingly more crowded and the concentration of our professional population in the largest centers for the moment appears rather at its peak. At the same time business is demanding higher educational qualifications and our colleges and professional schools are extending the terms of study and making their curricula more exacting.

These factors, it seems, will have larger effect upon future office-building construction than in the past. In the ensuing transition it is very likely that modern office-building requirements will become proportionately heavier in our smaller cities where new construction during the last decade has not been unduly heavy. It is in our smaller centers where factors of obsolescence have had less effect in dictating new office building than in our larger cities, where shifting commercial areas, rising land values, and advancing taxes have virtually shortened the economic life of office buildings.

Opportunities in Smaller Cities

Many are the smaller cities where present office-building facilities have long since become obsolete in the light of standards known to our largest centers. The time appears ripe for a careful appraisal of these conditions and a methodic approach for their betterment.

Deconcentration in our professional population which present economic conditions may force in favor of our smaller cities will likely hasten office-building construction in those cities which are alert to the implications of the present population and economic trends. Carefully conceived new office-building projects in our smaller centers would serve to depopulate existing obsolete and outmoded buildings. In this process civic pride would be reawakened and the play of economic forces affecting realty would affect other classes of construction.

HOW PAINTS SHOULD BE GUARANTEED

It appears that a certain architect in a large Eastern city has prepared a specification for a building, which states that as a condition precedent to any payment on account of painting work the contractor shall deliver a written guarantee from the paint manufacturer whose products are used. This guarantee is to the effect that all materials applied to painted or tinted surfaces shall remain of true color, will not chalk, fade, tarnish, crack, peel, or otherwise deteriorate.

It is obvious that a paint manufacturer could not honestly give such a guarantee. There are too many things entering into the service of a paint product for a responsible manufacturer to guarantee its performance in the manner outlined by the architect referred to above.

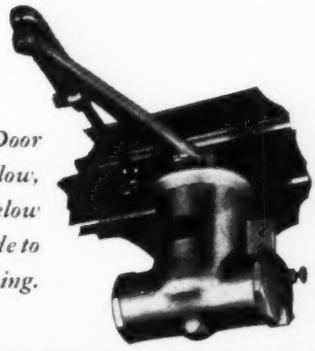
The situation would be analogous to one which could be visualized, in which a flour manufacturer produces the finest biscuit flour in the world. The flour is used by a trained chef in a famous hotel, who produces from it the most delicious biscuits. A bride purchases a bag of the same flour and makes soggy, heavy, indigestible biscuits. Surely the flour manufacturer should not be blamed for the lack of skill of the bride or the improper cooking devices with which she may have operated. Similarly, a paint manufacturer cannot be expected to guarantee his products against defects which may be caused by faulty methods of application or faulty surfaces, such as newly plastered walls which are reeking with water.

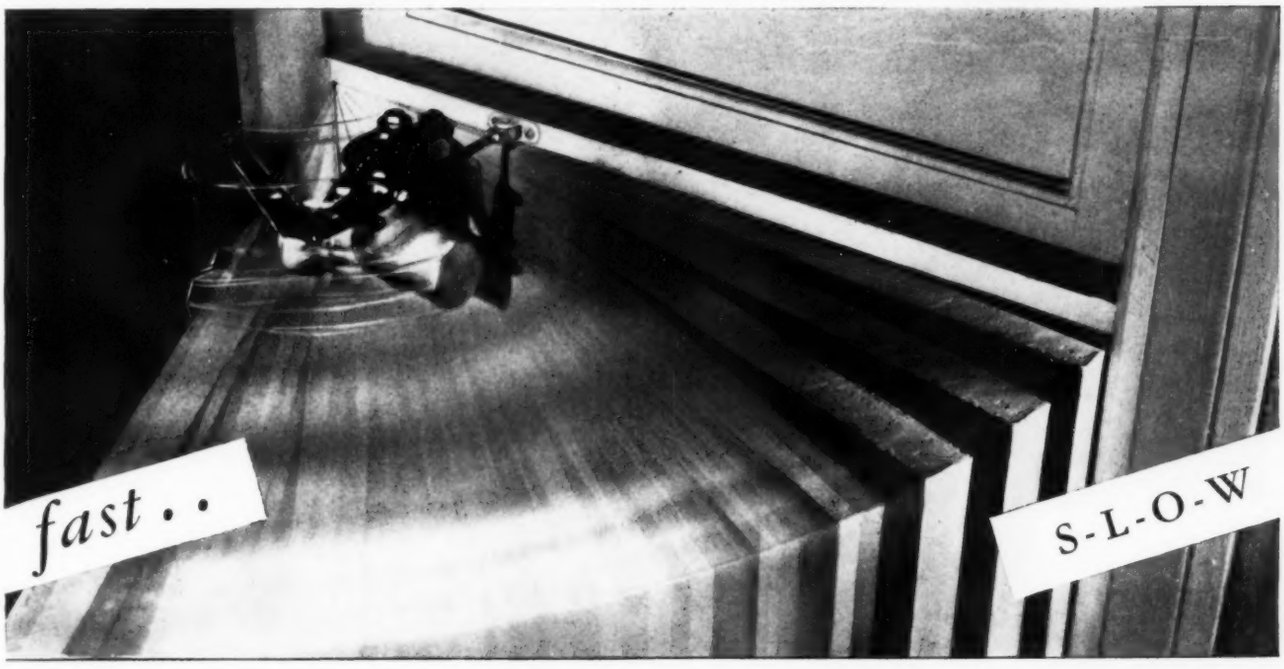
It is true that some makers of low grade paints may make guarantees which are unjustified and which are so worded as to ultimately provide but little comfort to the user in case of difficulty. Such guarantees are misleading and unethical. In my opinion, the best guarantee is for the architect to select quality paints made by a manufacturer of established reputation or sold by a dealer in whom he has confidence. When such paints are specified by the architect and applied by the painter with reasonable precautions, satisfactory results will be obtained.

While an architect should have some understanding of the fundamental qualities and weathering effects of different paints, he cannot be expected to have a complete knowledge of the subject, since over a thousand materials are employed in the manufacture of painting products. His safest course is to adhere to quality brands with which he has had experience, and insist that these brands be used.

H. A. Gardner, Director,
Institute of Paint and Varnish Research
Washington, D. C.

Thanks to its "specialized speed control" *the new Corbin Door Check, Model 131, closes doors first fast, then slow — or first slow, then fast—or just slow or fast, whatever way suits the job best. Below is composite photograph showing adjustment by which door is made to close fast to within a few inches of jamb—then slow to a silent latching.*





New Corbin door check works magic with doors

The new Corbin Door Check, Model 131, offers you and your clients something you have never had before; the opportunity to have your doors closed exactly the way that suits you best.

If you want your doors closed fast to keep out prying eyes, Corbin has taken care of that. The new Model 131 can be adjusted (simply by turning a button) so that it will close *f-a-s-t* to within a few inches of the jamb, then smoothly . . . slowly . . . to a silent latching.

Or, on an outside door, where stiff latch springs or strong drafts tend to prevent the door from latching, you can close it slowly enough to let people in or out without the door banging their heels, but when it is only a few inches from the latch you can accelerate its speed so that it closes snugly, firmly, every time.

Or, you can close the door slowly all the way, or *fast,* take your choice.

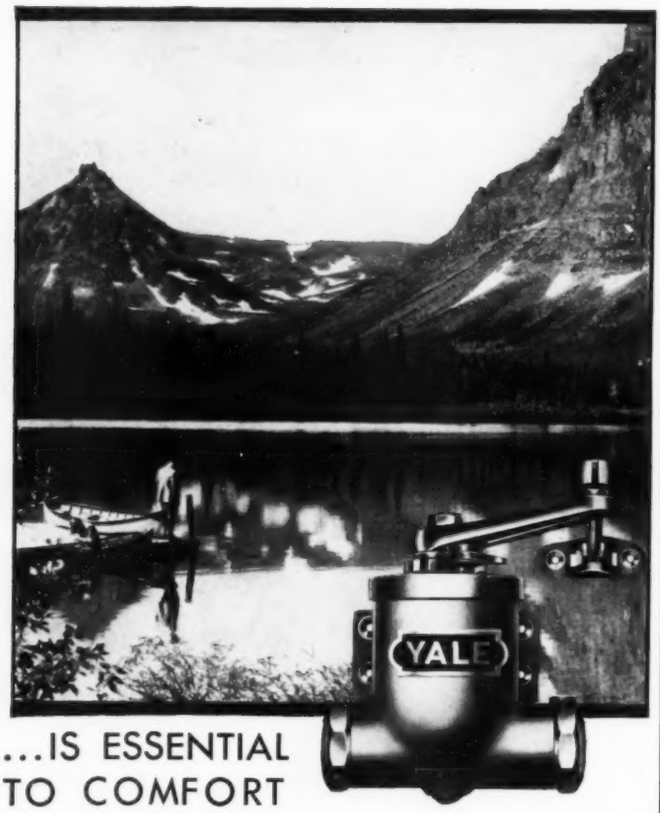
The new Model 131 can be used on any door, either side. It is approved by the Underwriters Laboratories.

P. & F. CORBIN SINCE 1849 New Britain, Conn., U. S. A.
The American Hardware Corporation, Successor
New York Chicago Philadelphia

GOOD BUILDINGS DESERVE GOOD HARDWARE

CORBIN

QUIET



...IS ESSENTIAL TO COMFORT

TO specify Yale Door Closers is a mark of thoughtful planning. It is an insurance of the lasting comfort which silent, efficient and dependable control of doors will give to the occupants of the building you design.

Yale Door Closers are made with the precision that distinguishes the construction of any fine engine. Each is subjected to thorough working tests. There is a range of models and sizes to meet all requirements.

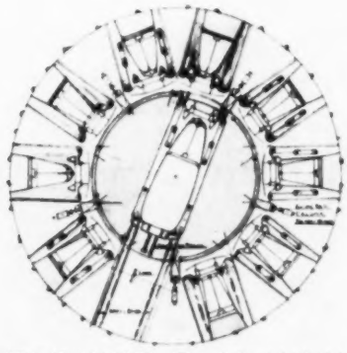
Illustrated folders gladly sent on request

THE YALE & TOWNE MFG. CO.
STAMFORD, CONN., U. S. A.

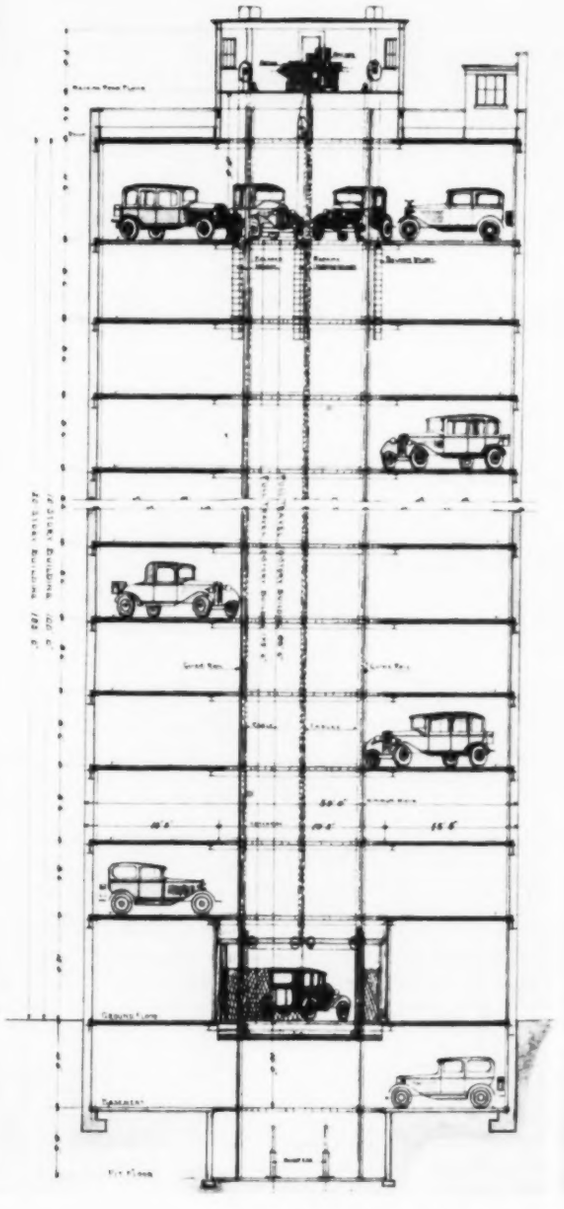
CIRCULAR ELEVATOR GARAGE (PATENTED)

Designed by
William P. Allred, Jr., Architect and
F. E. Turner, Elevator Engineer.

The automobile is driven to the entrance of the elevator on the ground floor, left with brakes un-



PARKING PLAN VIEW



Honoring a Distinguished Location

MARKET STREET NATIONAL BANK BUILDING
Philadelphia, Pa.
Architects: Ritter & Shay
Plumbing & Heating Contractor: Wm. M. Anderson.

At the apex of the "golden triangle" in Philadelphia, the new Market Street National Bank has a proud position and occupies it well. Standing at the very center of the mercantile, financial, and governmental life of the city, and with the principal railway stations, hotels, and theatres only a few steps away, it towers above neighboring structures and has light, air, and outlook. Its style is both dignified and modern. Its plan and equipment embody all that is most approved and most desirable in an office building. As a whole, its distinction is evident.

The choice of any material for use in such a project is a recognition of undoubted merit in that material. In the Market Street Bank Building, the major pipe tonnage is NATIONAL—

America's Standard Wrought Pipe

NATIONAL TUBE COMPANY
Subsidiary of United States Steel Corporation
PITTSBURGH, PA.

US STEEL

NATIONAL PIPE

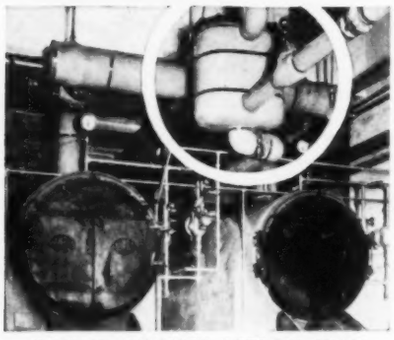
UNLIMITED HOT WATER

At Practically no cost for 48 Apartments from One EXCELSO Heater

ONE Excelso Indirect Water Heater, operating in conjuction with the steam heating boilers, supplies unlimited hot water for all tap purposes to the 48 apartments in this fine new building. In this case as with more than 800,000 other Excelso installations, the cost of heating the domestic hot water supply is practically nothing as long as the boiler is being fired.

Excelso Indirect Water Heaters may be installed on any steam or vapor boiler, in new buildings or old.

Four models in eighteen sizes care for all buildings from small cottages to large apartments, hotels, office buildings, factories, stores, hospitals, etc. Write, or ask any plumbing contractor, for the complete Excelso story.



All Excelso Indirect Water Heaters have removable copper coils and the exclusive Excelso ground joint brass connections which eliminate the use of gaskets

KEAN APARTMENTS, DETROIT, MICH.
Chas. N. Noble, Architect — C. F. Caughey, Engineer
R. P. Peckham, Plumbing & Heating Contractor

This installation is a splendid example of an Excelso Indirect Heater using live steam from the boilers to heat the domestic water supply. Where steam pressure is subject to variation, however, as in most cases, the Excelso is best connected below the water line on the boiler, using hot water from the boiler instead of steam to heat the domestic water supply.

Sold and Installed by Leading Plumbing and Heating Contractors Everywhere

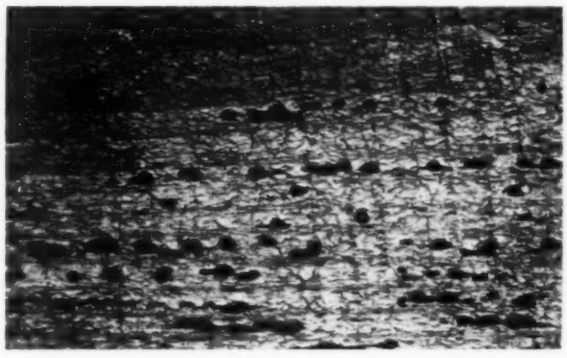
EXCELSO PRODUCTS CORPORATION
67 Clyde Ave. Buffalo, N. Y.

EXCELSO INDIRECT WATER HEATERS

SIZES FOR ONE FAMILY TO ONE HUNDRED

(Continued from page 56)

set; then, by pressing a button, it is automatically loaded on the elevator by an electrically driven two-speed loading device. This same device also locks the automobile in position on the elevator during its vertical travel. The automobile is then placed in position for delivery into a predetermined space adjoining the elevator shaft by the electrically driven rotatable platform. This operation is performed while the elevator is traveling. The automobile is delivered into the designated space, contacting the elevator, as shown, by the electrically driven loading device, and is also locked therein by this device. The automobile is returned to the ground floor by reversing the operation, and upon pressing a button, it is automatically delivered in the exit driveway, ready for use, by the electrically driven unloading device.



An example of wood which has been damaged by termites.

HOME OWNERS WARNED OF "TERMITE TREATMENT" FRAUDS

Home owners should beware of alarming reports of injury to buildings by termites or white ants, says the U. S. Department of Agriculture. Many "termite treatments" are expensive and are not correspondingly effective.

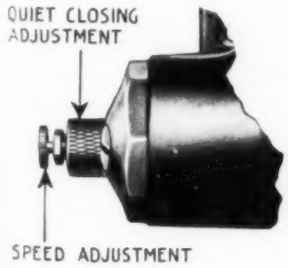
State officials and others reporting to the Bureau of Entomology reveal that in the South and in some of the Far Western States salesmen have been exaggerating the danger from termites in an effort to sell treatments. The Bureau says that conditions are substantially the same now as they have been for the last fifty or one hundred years. The records indicate that the collapse of a building because of termite damage is so rare as to be for practical purposes a negligible risk. It is true, however, that where termites have been in buildings for many years the foundation timbers, and even the floors and adjacent woodwork, may become so weakened as to make necessary some replacement.

The entomologists point out that an experience of 35 years in termite control indicates that radical reconstruction of the foundations is the only permanent and effective remedy for buildings which

AS MODERN AS TOMORROW—

AS ENDURING AS TIME!

Russwin Door Closers are equipped with a dual control valve giving positive control of door from full open position to the latching point.—The speed valve is used to increase or decrease speed of door.—The quiet closing valve eliminates the impact of door against jamb.—Russwin Door Closers can also be adjusted to allow the door to travel swiftly from full open position to within a few inches of the jamb—closing softly and quietly from this point on.



R&E SINCE 1830
RUSSWIN
RUSSELL & ERWIN
DISTINCTIVE HARDWARE

RUSSELL & ERWIN MANUFACTURING COMPANY (THE AMERICAN HARDWARE CORPORATION, SUCCESSOR)
New Britain, Connecticut New York Chicago London

Because of Quality . . .
through and through . . .

The Chicago Board of Trade installed Sterling Lifelong Blackboard

THE Chicago Board of Trade wanted the best of everything for their new building—including Blackboard. That their final selection was Sterling Lifelong Blackboard is a distinction of which we are justly proud.

You can safely specify Sterling for your school jobs—and stand behind it. It is quality through and through—and we guarantee it unreservedly. Known for its perfect writing qualities, and a surface that is free from irregularities, blemishes and imperfections. It takes chalk marks clearly. It never strains reader's eyes. It is sturdy, giving years and years of outstanding performance. No amount of service can break down the cement-asbestos, fire-resisting backing. Easy and economical to install, Sterling is the most dependable Blackboard you can specify for *every* Blackboard job.

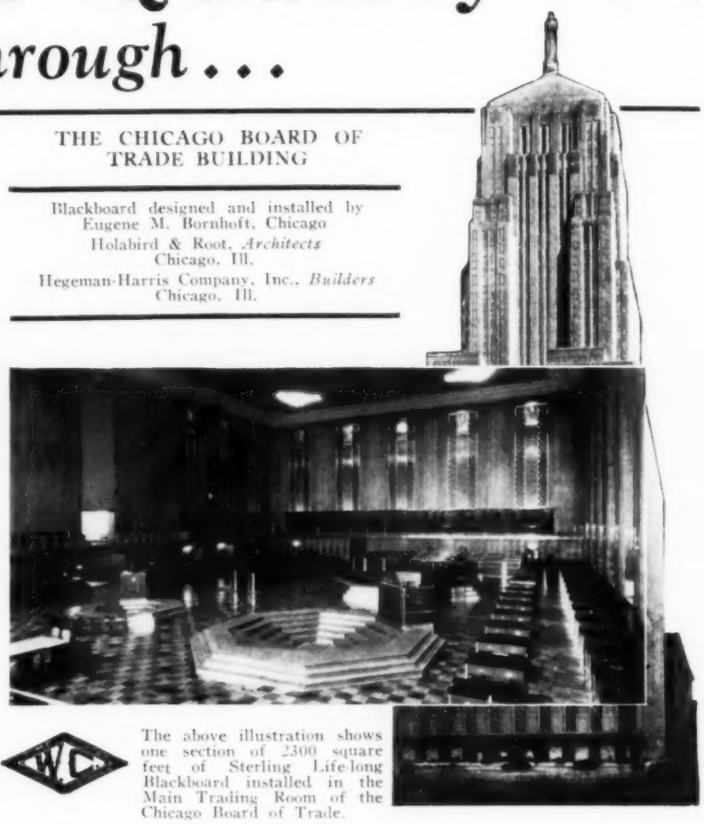
Address Dept. S1050 for 15 pages of plans, elevations and detailed specifications for the installation of *any* blackboard—A.I.A. File No. 35-b-12. Prepared for you by architects. Free for the asking—with a sample of Sterling, too, cut right from stock.

Weber Costello Co.
Chicago Heights, Illinois

Makers of STERLING LIFELONG BLACKBOARD, OLD RELIABLE HYLOPLATE, VELVASTONE, GLOBES, MAPS, ERASERS, CRAYON

THE CHICAGO BOARD OF TRADE BUILDING

Blackboard designed and installed by Eugene M. Bornhoft, Chicago
Holabird & Root, *Architects* Chicago, Ill.
Hegeman-Harris Company, Inc., *Builders* Chicago, Ill.



The above illustration shows one section of 2300 square feet of Sterling Life-long Blackboard installed in the Main Trading Room of the Chicago Board of Trade.

(*Continued from page* 58)

because of original faulty construction, have become heavily infested. Spraying and fumigation are practically useless.

Termite-proof foundations can be provided in two ways:

(1) Reconstruct the foundation walls, including cellar and cellar floors, of concrete and stone, using standard mortar; thoroughly fill all openings in masonry or tile construction; and use, where necessary, mechanical barriers such as metal termite shields.

(2) Wood and all foundation timbers touching the ground or near it should be impregnated in an approved manner by one of the standard chemical wood preservatives.

EARLIER BOOKS ON HOUSING

(See also reviews of recent publications, pages 303-05.)

RECENT BOOKS AND REPORTS ON HOUSING, ZONING AND TOWN PLANNING. An excellent bibliography which includes publications for many countries, states and individual cities. National Housing Association Publications, 105 East 22nd Street, New York City, 1930. 50 cents.

REPORT OF THE UNITED STATES HOUSING CORPORATION. U. S. Bureau of Industrial Housing and Transportation. Vol. 2: Houses, site-planning, utilities. Washington, Government Printing Office, 1919. 524 pp. Photographs, plans, perspectives, elevations, diagrams, tables.

INDUSTRIAL HOUSING. Morris Knowles. New York, McGraw-Hill Book Company, Inc., 1920. 408 pp. Photographs, plans, diagrams, charts, tables. Bibliography, pp. 388-393.

REGIONAL PLAN OF NEW YORK AND ITS ENVIRONS.
Vol. VI. Buildings: Their Uses and Spaces About Them—Including Reports on Zoning, Housing, and Economics of High Buildings.
Vol. VII. Neighborhood and Community Planning—Three Monographs on: The Neighborhood Unit; Sunlight and Daylight for Urban Areas; and Problems of Planning Unbuilt Areas.
Published by The Regional Plan of New York, 130 East 22nd Street, New York City. Volumes may be purchased separately at $3 each.

A PRIMER OF HOUSING. A. C. Holden and others. Workers' Education Bureau, 476 West 24th Street, New York City, 1927. 35 cents.

BUILDING CODE COMMITTEE REPORTS. Division of Building and Housing of the Department of Commerce, Washington, D. C.

Recommended Minimum Requirements for Small Dwelling Construction. 15 cents.
Recommended Minimum Requirements for Plumbing in Dwellings and Similar Buildings. 35 cents.
Recommended Minimum Requirements for Masonry Wall Construction. 15 cents.

HAIR-BREADTH

ACCURACY HERE

PUTS AN ARCHITECT'S HOUSE ON SURE GROUND

Kohler fixtures deserve Kohler fittings, their equal in beauty of design and serviceability.

CLIENTS aren't so much concerned about the thought that goes into the making of fittings as about the hot and cold water that comes out. But *you* have to go deeper than the surface and look for fine points of structure and design. You have to be sure that care at our end will mean comfort at your end . . . fittings that keep a house running smoothly, that *fit* once and for all.

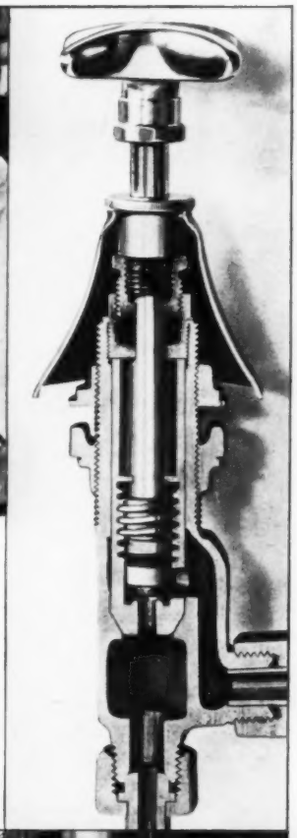
Talk to some other architect who makes it a habit to specify Kohler real-red-brass fittings on all jobs, large and small, and he'll soon tell you what won him over. Accuracy of manufacture, for one thing. The interchangeable unit of a lavatory valve fits into the outer casing within .004 of an inch! Deep, fast-action threads, always completely engaged, eliminate side-sway and protect against unnecessary wear. Interchangeable handles are so delicately poised that valves open and shut at finger-tip pressure.

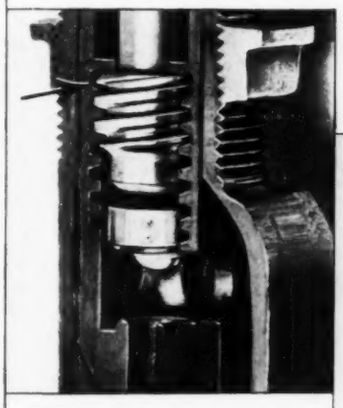
And Kohler accuracy is closely guarded. Each fitting must pass through no less than seven major inspections to maintain Kohler standards of material and workmanship—including tests of the casting, threads, buffing, plating, and a final test before packing under 125-pound water pressure.

Compare Kohler fittings simply by weighing them in your hand. Heavier because they contain an extra amount of virgin copper, finished with a thicker, more uniform coating of hard and durable chromium plate, these fittings are obviously sturdier and more efficient. Designs are modern, correct. Action is quick and precise. Kohler Co. *Founded* 1873. Kohler, Wisconsin. Manufacturers of Kohler Electric Lighting Plants.

ABOVE—One of the seven major inspections made on each Kohler fitting before it reaches you. Here, the workman is water-testing the casting.

RIGHT—Cross-section of Kohler K-8020 lavatory valve. Note the accurate machining of all parts—especially the .004" fit of the interchangeable unit into the outer casing.

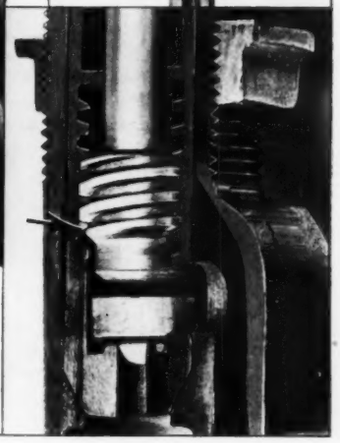




OPEN

The double Acme threads on Kohler valves are always completely engaged. This prevents side-sway, and protects against wear.

CLOSED



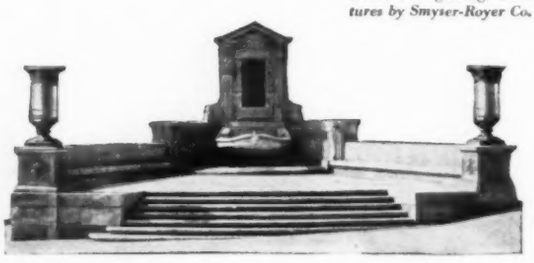
KOHLER OF KOHLER

PLUMBING FIXTURES AND FITTINGS

EXTERIOR LIGHTING FIXTURES *by* SMYSER-ROYER

The Attractiveness of Any Structure Depends Upon Distinctive Exterior Lighting

The Campbell Memorial, Portland, Oregon. Architect — Paul P. Cret, Philadelphia, Pa. Cast Bronze Lighting Fixtures by Smyser-Royer Co.



A·L·E·A

YOU ask — just what makes Smyser-Royer exterior lighting fixtures different and distinctive?

Made of the same metals as any others — cast iron — bronze — or aluminum, yet they are constructed with such skill, care and craftsmanship that these outstanding fixtures are preferred by leading architects the country over.

For 91 years Smyser-Royer has specialized in the careful reproduction of exterior lighting fixtures designed by architects. Long experience in this type of work has built for Smyser-Royer a reputation for dependable craftsmanship among architects.

Architects who specify Smyser-Royer exterior fixtures are assured of careful, distinctive fabrication of their original designs.

Or — if stock designs are desirable, a wide selection of fixtures is offered in the Smyser-Royer Catalogue or in Sweet's Architectural Catalogues, Section D, Pages 6034 to 6044.

Ask for our catalogue for your files.

SMYSER-ROYER COMPANY

MAIN OFFICES AND WORKS, YORK, PENNA.

PHILADELPHIA OFFICE, 1700 WALNUT STREET

(*Continued from page 60*)

Minimum Live Loads Allowable for Use in Design of Buildings. 10 cents.
Recommended Practice for Arrangement of Building Codes. 10 cents.
Recommended Building Code Requirements for Working Stresses in Building Materials. 10 cents.
Recommended Minimum Requirements for Fire Resistance in Buildings. 10 cents.

COOPERATIVE HOUSING. Russell Sage Foundation Library, 130 East 22nd Street, New York City, 1929. 10 cents.

EUROPEAN HOUSING PROBLEMS SINCE THE WAR, 1914-1923. See p. 6. 1924. $1.50.
International Labor Office. World Peace Foundation, 40 Mt. Vernon Street, Boston, Mass.

GUIDEBOOK FOR BETTER HOMES CAMPAIGNS IN CITIES AND TOWNS. 48 pp. 1931. 10 cents.

GUIDEBOOK FOR BETTER HOMES CAMPAIGNS IN RURAL COMMUNITIES. 32 pp. 1931. 5 cents.
Better Homes in America, 1653 Pennsylvania Avenue, Washington, D. C.

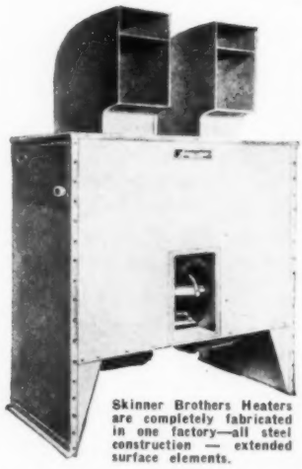
HOUSING SITUATION IN THE UNITED STATES. p. 4. World Peace Foundation, 40 Mt. Vernon Street, Boston, Mass. 1925. 25 cents.

TWELVE HOUSING NEEDS OF AMERICAN CITIES. American City, 470 Fourth Avenue, New York City. April 1930.

OUR CITIES TODAY AND TOMORROW. A Survey of Planning and Zoning Progress, by T. K. Hubbard and H. V. Hubbard. Harvard University Press, Cambridge, Mass., 1929. 389 pp. $5.

AIRBLANKET TRADE MARK

HEATING



Skinner Brothers Heaters are completely fabricated in one factory—all steel construction — extended surface elements.

The Airblanket method of Unit Heating assures greater economy because it minimizes heat loss in the upper portion of the building—greater efficiency because heat is more homogeneously distributed throughout the breathing zone—greater comfort because the warm air stratum is at the floor—a shortened warm-up period because warmth is kept in the breathing zone.

Write for complete information on Skinner Brothers Airblanket Heating.

The Original SKINNER BROTHERS MANUFACTURING COMPANY INC.

1474 S. Vandeventer Ave. St. Louis, Missouri